

ARISTOTLE ON EARLIER GREEK PSYCHOLOGY

This volume is the first in English to provide a full, systematic investigation into Aristotle's criticisms of earlier Greek theories of the soul from the perspective of his theory of scientific explanation. Some interpreters of the *De Anima* have seen Aristotle's criticisms of Presocratic, Platonic, and other views about the soul as unfair or dialectical, but Jason W. Carter argues that Aristotle's criticisms are in fact a justified attempt to test the adequacy of earlier theories in terms of the theory of scientific knowledge he advances in the *Posterior Analytics*. Carter proposes a new interpretation of Aristotle's confrontations with earlier psychology, showing how his reception of other Greek philosophers shaped his own hylomorphic psychology and led him to adopt a novel dualist theory of the soul-body relation. His book will be important for students and scholars of Aristotle, ancient Greek psychology, and the history of the mind-body problem.

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ARISTOTLE ON EARLIER GREEK PSYCHOLOGY

The Science of Soul

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*For Beth, who first believed, and Lauren, who
never lost hope, and for Henry, to wonder*

Contents

<i>Acknowledgements</i>	<i>page ix</i>
<i>List of Abbreviations</i>	<i>page xi</i>

Introduction to Hylomorphic Psychology	I
--	---

PART I ARISTOTLE'S METHODOLOGY OF PSYCHOLOGICAL INQUIRY	19
--	----

1 Definition, Explanation and Psychological Inquiry	21
2 Definition, Explanation and the Soul–Body Relation	47

PART II EARLIER THEORIES OF PSYCHOLOGICAL MOTION	57
---	----

3 Plato's Psychology	59
4 Democritus' Psychology	79
5 Xenocrates' Psychology	103
6 Harmonic Psychology	123

PART III EARLIER THEORIES OF PSYCHOLOGICAL COGNITION	141
---	-----

7 Empedocles' Psychology	143
8 Anaxagoras' Psychology	168

PART IV EARLIER THEORIES AND TWO PSYCHOLOGICAL PUZZLES	191
9 The Puzzle of the Soul's Uniformity	193
10 The Puzzle of the Soul's Divisibility	206
Conclusion: Hylomorphic Psychology as a Dualism	219
<i>Bibliography</i>	228
<i>Index Locorum</i>	243
<i>General Index</i>	252

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Abbreviations

Aristotle's Works

<i>APo</i>	<i>Posterior Analytics</i>
<i>APr</i>	<i>Prior Analytics</i>
<i>Ath. Pol.</i>	<i>Constitution of Athens</i>
<i>Cat.</i>	<i>Categories</i>
<i>DA</i>	<i>On the Soul</i>
<i>DC</i>	<i>On the Heavens</i>
<i>DI</i>	<i>On Interpretation</i>
<i>Div.</i>	<i>On Divination in Sleep</i>
<i>GA</i>	<i>On the Generation of Animals</i>
<i>GC</i>	<i>On Generation and Corruption</i>
<i>HA</i>	<i>On the History of Animals</i>
<i>Insomn.</i>	<i>On Sleep</i>
<i>Iuv.</i>	<i>On Youth and Old Age</i>
<i>MA</i>	<i>On the Motion of Animals</i>
<i>Mech.</i>	<i>Mechanics</i>
<i>Metaph.</i>	<i>Metaphysics</i>
<i>Meteor.</i>	<i>Meteorology</i>
<i>NE</i>	<i>Nicomachean Ethics</i>
<i>PA</i>	<i>On the Parts of Animals</i>
<i>Phys.</i>	<i>Physics</i>
<i>Pol.</i>	<i>Politics</i>
<i>Resp.</i>	<i>On Respiration</i>
<i>Rhet.</i>	<i>Rhetoric</i>
<i>SE</i>	<i>On Sophistical Refutations</i>
<i>Sens.</i>	<i>On Sense and Sensible Objects</i>
<i>Spirit.</i>	<i>On Breath</i>
<i>Top.</i>	<i>Topics</i>

Plato's Works

<i>Alcib. I.</i>	<i>Alcibiades I</i>
<i>Crat.</i>	<i>Cratylus</i>
<i>Euthyph.</i>	<i>Euthyphro</i>
<i>Hipp. Maj.</i>	<i>Hippias Major</i>
<i>Leg.</i>	<i>Laws</i>
<i>Men.</i>	<i>Meno</i>
<i>Par.</i>	<i>Parmenides</i>
<i>Phaed.</i>	<i>Phaedo</i>
<i>Phaedr.</i>	<i>Phaedrus</i>
<i>Rep.</i>	<i>Republic</i>
<i>Soph.</i>	<i>Sophist</i>
<i>Theaet.</i>	<i>Theaetetus</i>
<i>Tim.</i>	<i>Timaeus</i>

Ancient Commentators

Alex.	Alexander of Aphrodisias
Philop.	Johannes Philoponus
Simplic.	Simplicius
Sophon.	Sophonias
Themist.	Themistius

Other Ancient Authors

Aesch.	Aeschylus
Aët.	Aëtius
Aristoph.	Aristophanes
August.	Augustine of Hippo
Cic.	Cicero
Epicur.	Epicurus
Eurip.	Euripides
Gal.	Galen
Herod.	Herodotus
Hippoly.	Hippolytus
Hom.	Homer
Plut.	Plutarch of Chaeronea
Sext.	Sextus Empiricus
Tertul.	Tertullian
Theophr.	Theophrastus

Other Abbreviations

Diels	H. Diels, <i>Doxographi Graeci</i> (Berlin: Reimer, 1879).
DK	H. Diels, <i>Die Fragmente der Vorsokratiker</i> , 6th edn, revised by Walter Kranz, 3 vols (Berlin: Weidmann, 1951).
KRS	G. Kirk, J. Raven, and M. Schofield, <i>The Presocratic Philosophers</i> (Cambridge: Cambridge University Press, 1983).
LS	A. Long and D. Sedley, <i>The Hellenistic Philosophers</i> , 2 vols (Cambridge: Cambridge University Press, 1987).
LSJ	H. Liddell and R. Scott, <i>A Greek-English Lexicon</i> (Oxford: Clarendon Press, 1940).
OCT	W.D. Ross, <i>Aristotelis De Anima</i> (Oxford: Clarendon Press, 1956).
ROT	J. Barnes, <i>The Complete Works of Aristotle</i> (Princeton, NJ: Princeton University Press, 1984).
TEGP	D. Graham, <i>The Texts of Early Greek Philosophy: The Complete Fragments and Selected Testimonies of the Major Presocratics</i> , 2 vols (Cambridge: Cambridge University Press, 2010).

The Greek texts cited in this book are all from the *Thesaurus Linguae Graecae Canon of Greek Authors and Works* (TLG), 3rd edn (1990), Oxford.

References to Aristotle follow the standard Bekker numbering as found in I. Bekker and C. Brandis (eds.), *Aristotelis Opera* (1831–1870).

References to Plato follow the standard Stephanus pagination of the OCT, J. Burnet (ed.) (1900–1922), *Platonis Opera*, 5 vols., Oxford.

References to the Greek Commentators are to H. Diels (ed.), *Commentaria in Aristotelem Graeca* (1892–1909).

Citations of the Presocratic fragments and testimonies refer first to the standard collection of Diels and Kranz (= DK). I have also linked them when possible to D.W. Graham's more recent English collection and translation of the complete fragments and selected testimonies of the Presocratics, *The Texts of Early Greek Philosophy* (= TEGP), and sometimes to their original sources when appropriate.

Introduction to Hylomorphic Psychology

He who travels every path will not find out the limits of the soul,
so deep is his account.

Heraclitus¹

0.1 The Origins of Hylomorphic Psychology

How does one determine the first principles of a science if one does not know what sort of object the science is about? As the author of the earliest extant systematic treatise on psychology in the Western tradition, Aristotle is in a remarkable historical situation when he begins his inquiry (ἱστορία) into the science of soul (ψυχή).

After reviewing and criticising earlier views about its nature in *DA* 1.2–5, he affirms a series of striking theses: soul must be a substance (οὐσία), and a substance in the sense of a form (εἶδος), as opposed to a material (ύλη)² or form-material composite, and a form in the sense of a fulfilment (ἐντελέχεια) of a material's potentiality.³ He then claims that there are two kinds of fulfilment – the first being a mental state like knowledge, the second being the conscious awareness of what one knows – and that the

¹ Adopting the text of Betegh (2009).

² I opt for this translation, rather than 'matter', because 'matter' in English immediately imports the idea of atomic discreteness, absent from Aristotle's ύλη.

³ *DA* 2.1, 412a19–20. The Greek term ἐντελέχεια, which is an Aristotelian coinage, is usually translated as 'actuality', or 'actualisation'. There are difficult problems as to whether this term has a different sense from the term ἐνέργεια (especially in *De Anima*), another Aristotelian coinage which bears the various meanings of 'actuality', 'operation', and 'activity'. However, since ἐντελέχεια combines the adjective ἐντελής (full/complete) with the verb ἔχειν (to be/carry), and so literally means something like 'holding in completeness', to capture its sense – which I take to be both 'static' and 'kinetic' – I translate it here as 'fulfilment'. See *Metaph.* Θ.3, 1047a30–b2. Cf. Blair (1967); Johansen (2012, 16).

soul is of the first kind, and belongs to a natural instrumental body potentially in possession of life.⁴ From this, he infers that *if* the soul has a general definition, it is: ‘the first-fulfilment of a natural instrumental body’ (ἐντελέχεια ἡ πρώτη σώματος φυσικοῦ ὀργανικοῦ).⁵ How did Aristotle reach these conclusions?

We know part of the answer. This general definition of *soul* belongs to Aristotle’s ‘hylomorphic’ theory of nature.⁶ Hylomorphism can be expressed as a theoretical commitment to two principles: (1) there are four fundamental kinds of explanatory causes in the world – the formal, final, efficient, and material cause (the first three of which can be identical),⁷ and (2) all natural substances in the section of the cosmos residing below the moon are ultimately analysable into at least two of these causes: a specific material (ὕλη) and its form or organisation (μορφή).⁸

Given this theoretical background, Aristotle’s first general definition of soul in *DA* 2.1 advances what I call the *Hylomorphic Thesis*. It claims that: (A) soul is an instance of form, (B) the instrumental body in which soul resides is a material characterised by having a potentiality for a certain form of life, and (C) a living being is a unified item composed of both soul (form) and instrumental body (material).

Aristotle’s best attempts to elucidate the distinction between a form and a material rest upon analogies invoking a distinction between a perceptible stuff and the geometrical shape it can be moulded into, such as a lump of bronze taking on the shape of a statue.⁹ Hence, one might infer that all that the soul is for him is a sort of mathematical ‘aspect’ of an ensouled being that remains constant through its life;¹⁰ or worse, one might think that it is no more than the literal shape of the body.¹¹ However, at the beginning of *DA* 2.4, Aristotle insists that the notion of form, as it applies to the soul–body relation in psychology, goes beyond the idea of geometrical shape. Indeed, it might not include it at all. Drawing upon his four-causal theory, Aristotle attempts to determine with more precision

⁴ *DA* 2.1, 412a27–8.

⁵ *DA* 2.1, 412b5–6.

⁶ See Williams (1986). On the history of how the term ‘hylomorphism’ entered into standard scholarly use, see Manning (2013).

⁷ Cf. *Phys.* 2.3, 194b16–195a3; *Metaph.* A.3, 983a24–b1.

⁸ See Kelsey (2010, 109).

⁹ *Phys.* 2.3, 194b23–9.

¹⁰ An excellent picture of this view of soul is provided in Nussbaum (1984).

¹¹ On problems with the conception of form as a cause, see Irwin (1988, 100–2). Aristotle argues against reducing the concept of form to that of shape (σχῆμα) in *PA* 1.1, 640b30–6.

the kind of cause(s) the soul can function as.¹² In doing so, a fuller view of Aristotle's hylomorphic psychology emerges. He writes:

But the soul is the cause (αἰτία) and the first principle (ἀρχή) of the living body. But these things are said in many ways, and similarly, the soul is the cause in each of the three ways we have defined. For the soul is the cause 'from which' (ὅθεν) motion begins, and the cause 'for the sake of which' (οὗ ἕνεκα) and as the substance (οὐσία) of ensouled bodies. So, that it is a cause as substance is clear. For the cause of being for everything is its substance (οὐσία); but life is being for animals, and the cause and first principle of life is soul. Still, what determines (λόγος) what is in potentiality is fulfilment. But it is also apparent that the soul is the cause in the sense of 'for the sake of which'. For just as mind produces for the sake of something, in the same manner so does nature, and this is its end (τέλος). But the sort of end which accords with nature in a living being is the soul. For all the natural bodies (τὰ φυσικὰ σώματα) are instruments (ὄργανα) of the soul, just as [the natural bodies] of animals [are instruments of the soul], and in this way also [the natural bodies] of plants [are instruments of the soul], and these exist for the sake of the soul. (But there are two senses of 'that for the sake of which', the end 'for which' and the 'for whom'.) But indeed soul is also that 'from which' local motion first begins, although this capacity does not belong to all animals. And alteration and growth also occur in virtue of the soul (κατὰ ψυχὴν). (DA 2.4, 415b8–24)

Here it becomes clear that Aristotle thinks that soul is not just a substance in the sense of the *formal cause* of a material body endowed with the capacity for life. It is also the *efficient cause* of the characteristic motions of a living body (i.e. that 'from which' animal local motion and growth are produced), and it is the *final cause* of the functions for which a living body serves as an instrument.¹³ Call this additional claim about the soul's functioning as a unified efficient and final cause the *Efficient-Final Causal Thesis*.

Aristotle also argues for at least three more ancillary theses that he views as essential to hylomorphic psychology. The third, call it the *Non-Uniformity Thesis*, is that, strictly speaking, the souls of different broad classes of living beings in nature are *not* uniform in kind, but are different in species and characterised by different essential capacities. The fourth, call it the *Part-Hood Thesis*, is that since the soul capacities of different species of soul can overlap, it is plausible to think that individual souls

¹² DA 2.2, 413b11–13. On the heterogeneous philosophical origins of these four causes, see Schofield (1991a).

¹³ See Leunissen (2010b, 55–7).

have ‘parts’ – in the sense of capacities – but not plausible to think that these parts are spatial, or subject to spatial division. The fifth, call it the *Separability Thesis*, is that at least one of these ‘parts’ of the soul, mind (*voûs*),¹⁴ although falling under the scope of the *Hylomorphic Thesis*,¹⁵ might be a fulfilment of the body ‘like a sailor on a ship’, whether because it can exist apart from the body in which it resides, or because it is something whose mode of existence does not involve natural motion, or both. If either of these conditions obtain, the rational part of the soul – mind – will be a subject of a science other than physics.¹⁶

How did Aristotle come to believe in these five theses? What were his reasons for thinking that soul is a *formal substance* that fulfils or brings into activity a certain kind of material body? How did he arrive at the idea that the soul functions as *three* of his four explanatory causes, as opposed to just one or two of them? Further, what led him to deny that the soul is a *material* cause? How did he come to believe that there are fundamentally *different kinds* of soul in different broad classes of living things, or that the capacity for thinking (*voûs*) might exist separately from the body?

There are a number of ways we might go about answering these questions. We might tell a developmental story by means of an analysis of the fragments of Aristotle’s early dialogues.¹⁷ Or, we might tell a likely story about Aristotle’s time at the Academy, and his departure from,¹⁸ or return to, Plato’s metaphysics.¹⁹ We might also incorporate a chronological story about the date of Aristotle’s various philosophical and empirical inquiries.²⁰

¹⁴ The term *voûs* and its cognates are difficult to translate consistently into English. It is often translated as ‘intellect’, but this technical term tends to mask the practical connotations that *voûs* can have in Greek. Frede (2008) points out that *voûs* is often best translated in English as ‘sense’, with the practical meaning of ‘having sense’ or ‘being sensible’, but this translation suffers the reverse problem of masking its theoretical connotations. In Menn’s (1995) important study, he argues that *voûs* is best read as a virtue term, and suggests translating it as ‘rationality itself’ or ‘reason’. Shields (2016) also gives good arguments for translating it as ‘reason’. Since ‘rationality itself’ will not work in most Aristotelian contexts, ‘reason’ is a good choice, and flexible enough to capture Aristotle’s meaning most of the time. Even so, in this work, I have opted to use ‘mind’ as the translation of *voûs*, and ‘thinking’ as the translation of *νόησις*. My reasons for these choices are, first, that ‘thinking’, like the Greek it translates, can be used in both practical and theoretical contexts. Second, ‘mind’ is a tolerable translation of *voûs* in the Presocratics quite generally, where it is most often used as a mass-noun. See Barnes (1982, 406).

¹⁵ Pace Ross (1961, 214).

¹⁶ The first separability condition is specified at *DA* 1.1, 403b15–16. The claim that something is separable in definition if it does not involve natural motion is given in *Phys.* 2.2, 193b31–5. Cf. *DA* 2.1, 413a6–10; Miller (2012).

¹⁷ See Menn (2002).

¹⁸ See Jaeger (1934); Nuyens (1973).

¹⁹ See Owen (1968b).

²⁰ See Dancy (1996). An overview of the debate on Aristotle’s development is provided in Wians (1996).

In this work, I tell a philosophical developmental story. This story claims that these questions can be answered by analysing the philosophical criticisms Aristotle gives of earlier Greek psychologies, both Platonic and Presocratic. For it is independently plausible to hold that, if a philosopher takes the time to offer detailed criticisms of a certain philosophical theory, *T*, and this philosopher then defends her own theory – call it *L* – in a way that tries to avoid those criticisms, then one is justified in inferring that this philosopher developed *L* *during* or *after* – and at least partly *in response to* – theory *T*. If so, then in order to fully understand how *L* developed, one must also understand the theory (or theories) that it is meant to replace, and the problems that are alleged to befall it (or them).

In what follows, I argue that Aristotle's criticisms of earlier Greek psychologies are best interpreted as an instance of the above scenario. This is because his criticisms of earlier Greek psychologies are not, in fact, merely an exercise in dialectical showmanship, but, as he himself tells us, an essential starting point on the path towards a science of soul. The task of this work is to show that Aristotle developed the five theses stated above by testing, by means of a demonstrative heuristic, the extent to which earlier Greek definitions of soul can be used to explain two attributes granted to belong to it: the power to cause motion (including the emotions), and the power to cause cognition (including perceptual and theoretical cognition) in living things.

0.2 The Alternative Story

This claim is, of course, controversial. The place where most of Aristotle's investigations into earlier Greek psychology occur is *DA* book 1, a work that, with the exception of its first chapter, has historically been neglected by scholars working on Aristotle's psychology.²¹ This neglect is partly due to two profoundly influential studies – Harold Cherniss's *Aristotle's Criticism of the Presocratics* (1935), and *Aristotle's Criticism of Plato and the Academy* (1944). These works appear to have shown that Aristotle was an unfair (albeit sophisticated) critic of his Academic and Presocratic

²¹ In Hamlyn's (2002) *De Anima* commentary, for instance, only excerpts of book one are included and discussed. Ross's (1961) own commentary on *DA* 1 is scant in comparison to books 2 and 3. This lack has been remedied in the more recent translation and commentary of Shields (2016).

predecessors, and that his method of treating their philosophical views throughout his corpus, including *DA* I, was eristical.²²

Cherniss's hermeneutic assumption was that, in *DA* I as elsewhere in his corpus, Aristotle simply assumed the truth of his own hylomorphic views, and then reinterpreted, often violently and unfairly, the *endoxa* of earlier thinkers as 'lipping' at its truth.²³ In recent decades, however, more attention to *DA* I has shown that Aristotle's criticisms of earlier thinkers do not take this simplistic form.²⁴ Although his criticisms of earlier views are certainly vigorous, he often shows signs of charity in their reconstruction.²⁵ In short, with respect to the interpretation of *DA* I, Cherniss's view is not viable.²⁶

The truth of the matter is more complicated. There is no endoxic reconciliation of the psychological theories discussed in *DA* I.2–5,²⁷ such as between the endoxic Democritean belief that the soul is made of fire-atoms and the endoxic Platonic belief that it is a self-moving motion. Such a reconciliation of these *endoxa* would be impossible. Nor does Aristotle appear to seek one. However, if dialectical opposition for the purpose of reconciliation by Aristotle's own hylomorphic theory is not the proper function of his criticism of earlier Greek psychologies, then what is? My alternative story begins here.

On the basis of Aristotle's works in natural or second philosophy, although soul is mentioned, it is not at all obvious what it is, nor what Aristotle *should* say it is. One cannot simply read the *Physics*, for

²² Early critics of Cherniss include Guthrie (1957) and Mansion (1961b). For a helpful review of the debate, see Collobert (2002). Kahn (1994, 22–3) makes a similar allegation when he mentions the 'frequent errors of Aristotle in the use of documents', but his evidence is hardly convincing. Misconstruing a genitive in *Ath. Pol.* 7.4 and writing 'Amasis' rather than 'Psammenitus' at *Rhet.* 2.8, 1386a20 (if Aristotle is indeed relying upon Herodotus, which is unclear) are certainly not sufficient to prove such frequency. Of the three further examples he gives of 'errors' in Aristotle's reading of Empedocles, none is obviously wrong. Barnes (1982, 14–15) provides a concise refutation of the view that the Peripatetics were poor or dishonest historians. I assume here, with Osborne (1987a, 12–13), that reading the Presocratics (and Plato) through the eyes of Aristotle can be a fruitful endeavour.

²³ Cherniss (1935, xiv), relying upon *Metaph.* A.10, 993a11–18. However, see Cooper (2012), who points out that the earlier thinkers to whom the charge is addressed do not include Plato and the Academy.

²⁴ For example, Danieli (1984); Irwin (1988); Witt (1992); Menn (2002, 102–3); Falcon (2009); Shields (1988a, 2007, 2016).

²⁵ See Hussey (2006, 24, n. 19): 'Interpretative charity is, of course, not exclusive of rigorous criticism of the doctrines so reconstructed; it is precisely because of their rigour that Aristotle's charity is often not noticed or not understood.'

²⁶ Cherniss (1935, xii).

²⁷ Cf. Irwin (1988, 280–2).

instance, and derive from its doctrines of material, formal, efficient, and final causes, the *Hylomorphic Thesis*, much less the *Efficient-Final Causal Thesis*. On the basis of this work, Aristotle could have affirmed the soul to be (A) itself a hylomorphic composite (e.g. a stuff like *pneuma* with its own ‘form’ and inner principle of self-motion),²⁸ or, in relation to the body and its parts, (B) a formal, final, but not efficient cause (supervenience epiphenomenalism),²⁹ (C) a formal, but not final or efficient cause (accidental epiphenomenalism), (D) an efficient, but not formal or final cause (Cartesian dualism; Pythagorean transmigratory dualism), or even (E) a material cause which served as an ingredient going into the mixture which composes bodies (material reductionism).³⁰

One could even go so far as to say some of these options, such as (A), would have been a more obvious choice for Aristotle, given some of his psychological commitments. For instance, he thinks that the soul is an efficient cause of the body’s motion,³¹ but his standard analysis of motion requires contact between two spatially extended objects.³² Aristotle’s argument in *DA* 1.1 that the affections of soul that are shared in common with the body should be defined with reference to each of the four causes does not help here, because this hylomorphic rule about how to define *affections* that are common to body and soul need not apply to the soul itself – especially if the soul has non-common or peculiar affections, as the *Separability Thesis* suggests.

Thus, even if, as Myles Burnyeat claims, psychological hylomorphism is the ‘crowning achievement’ of Aristotle’s natural philosophy,³³ we still need an explanation for why this achievement takes the form it does. The explanation I propose in this work is that the structure of hylomorphic psychology is governed by a *scientific*, as opposed to merely dialectical or eristical, exposition and criticism of earlier Greek theories of soul.³⁴ Aristotle has reason to carry out this scientific criticism, I claim, because it is unclear

²⁸ In fact, the author of the (presumably) spurious *De Spiritu* seemed to entertain this sort of possibility. See *Spirit.* 5, 483a30–3.

²⁹ See Caston (1997).

³⁰ This is a view Aristotle countenances in *DA* 1.5, 411a7–23.

³¹ *DA* 2.4, 415b10.

³² Cf. *Phys.* 3.2, 202a8; *Phys.* 7.1, 242b60/242b25; Wardy (1990, 126).

³³ See Burnyeat (2002, 36).

³⁴ In this work, I use the adjective ‘scientific’ in two primary ways: first, to describe claims which Aristotle takes to *be established* within a complete (or nearly complete) science (ἐπιστήμη) such as the *Physics*; second, to characterise the *method of inquiry* Aristotle is engaged in, and the kinds of arguments he uses, when he reviews and criticises earlier Greek thinkers. In this latter sense,

how exactly one should apply the basic insights of *general hylomorphism* to the specific case of the soul. As I said above, the four-causal framework hylomorphism provides could accommodate a range of ‘hylomorphic’ views about the relation between, and definition of, soul and body.

This is not a historical claim about the state of Aristotle’s philosophical views at the time of writing *DA* 1.³⁵ It is a claim about the philosophical reasons that led him to believe that a certain form of hylomorphic psychology is, in fact, explanatorily superior to earlier theories of soul as he understood them (including *other* hylomorphic theories, such as the harmony theory of soul held by Dicaearchus and Aristoxenus, which was on offer at the Lyceum).

Even so, my claim is consistent with at least one historical claim, which I think is likely true. This is that, at some point in time, perhaps during his twenty years as a student at Plato’s Academy, or after beginning to teach at the Lyceum upon his return to Athens from Assos, Aristotle critically engaged with the claims of earlier Greek thinkers ‘in the lab’, as it were,³⁶ and that *DA* 1 is a sort of record of Aristotle’s attempt to think through, both personally and alongside his peers at the Academy and his students at the Lyceum, earlier views about the soul. For instance, his list of criticisms of the harmony theory of soul likely began to take shape at the Academy through dialectical debates and in discussions with Plato about the *Phaedo*, but probably only crystallised at the Lyceum in discussions with Aristoxenus and Dicaearchus about the difference between mathematical and natural forms. The list of criticisms that now occupy *DA* 1.3–5, I take it, are the ‘lab notes’ that resulted from these personal and communal critical endeavours.

The complexity of Aristotle’s treatment of earlier psychologies in *DA* 1, split between their (mostly) uncritical presentation in *DA* 1.2, and their extensive criticism in *DA* 1.3–5, also strongly suggests the pre-existence of this lab work. It further suggests that, at least in terms of philosophical conception, some of this lab work is prior to that of the *Metaphysics*. For instance, although Aristotle’s concern with the unity of soul and body,

‘scientific’ means, ‘aims to establish a *Posterior Analytics* style ἐπιστήμη,’ or, as Aristotle says at the opening of *DA* 1.1, an εἰδησις of soul. The latter sense has a parallel in Aristotle’s description of the first figure of the syllogism as ‘most of all’ ἐπιστημονικόν, or ‘conducive to scientific knowledge’, suggesting that different arguments, and argumentative forms, can be more or less conducive to scientific knowledge. See *APo* 1.14, 79a17–23.

³⁵ Indeed, *DA* 1, just as *DA* 2 and 3, shows signs of recension and revision, primarily in incongruous logical transitions which reflect a change of subject and or terminology (e.g. at *DA* 1.1, 403a2–3).

³⁶ I owe this metaphor to Gábor Betegh.

discussed in detail in *Metaphysics Z*, provides a sufficient reason for ruling out some of the conceptions in (A)–(E) above, nevertheless, during the course of *DA* 1, Aristotle takes equally seriously the possibility that soul and body are unified in ways other than an essential hylomorphic relation between material and formal substances. For instance, he suggests that soul and body might be unified by an agent-patient relation, or a moved-mover relation, which implies their essential abilities to interact, but is neutral with respect to whether they constitute a hylomorphic compound.³⁷ This suggests that, in *DA* 1, Aristotle is recounting a previous conceptual stopping point along the path to his hylomorphic conception of soul.

0.3 Earlier Greek Psychologies and Hylomorphism

Aristotle's path to a 'science of soul', then, likely began with his serious engagement with, and criticism of, earlier Greek theories of soul, both Platonic and Presocratic. I shall argue that, to the extent that he found these theories to be viable (and some of them he did), they placed positive theoretical constraints on what he thought needed to be incorporated into his own theory of soul.³⁸ Similarly, to the extent that he found them intractable, they placed negative theoretical constraints on what his theory of soul needed to exclude. Although jointly these constraints do not completely determine the shape that Aristotle's hylomorphic psychology takes, they do limit it.

The first and most fundamental of the positive constraints on Aristotle's hylomorphic psychology is his acceptance of the attributes of the soul that he claims other thinkers to have handed down. These are that the soul is (1) the cause of the body's local motion, and (2) the cause of perceptive and intellectual forms of cognition.³⁹ A further condition is laid down later, that it is (3) either an incorporeal (ἄσωμῶτος) entity, or an extremely fine-grained body resident within a visible animal body.⁴⁰

Aristotle claims that earlier Greek thinkers tried to explain these psychological attributes in terms of the first principles (ἀρχαί) of nature they

³⁷ *DA* 1.3, 407b15–19.

³⁸ See Hussey (2012, 17).

³⁹ *DA* 1.2, 403b24–8.

⁴⁰ *DA* 1.2, 405b12. Cf. Hicks (1907, 234). Cf. *DA* 1.5, 409b21. As I shall show in Chapter 1, Section 1.7, strictly speaking, thesis (3) is represented by Aristotle as providing an explanation for thesis (1).

affirmed, viewed as ultimate causal constituents of the universe, or propositions that could explain the same.⁴¹ The negative theoretical constraints on Aristotle's inquiry involve seeing which of these first principles – which include axioms, hypotheses, and definitions – lead to explanatory dead ends.⁴² Importantly, as we will see, Aristotle only rejects earlier first principles (for example, Democritus' theory that the soul is a web of fire-atoms) *after* he has shown that they entail problematic conceptual or empirical consequences. These positive and negative theoretical constraints, I argue, commit Aristotle to a certain path that leads to, and partly justifies, the five hylomorphic theses laid out in Section 0.1 earlier in this introduction.

0.4 The Continuity of Hylomorphism and Earlier Greek Psychologies

As I show in the following chapters, although Aristotle rejects most of the particular elements of his predecessors' accounts of soul, he does adopt and modify a number of their principles for use within his own psychology. Among these principles are (A) the Platonic principle that the essence of soul is the *efficient cause* of the motions of living bodies, (B) the principle of the harmony theorists that soul is the *formal cause* or 'ratio' (λόγος) of the mixtures in a living body, and (C) the Empedoclean principle that soul perceives on the basis of a (modified) like-cognises-like principle. I shall also claim that Aristotle takes over from earlier thinkers other ancillary theses, again with certain modifications, such as (D) the Platonic principle that the soul has certain 'parts' that govern the body's activity, and (E) the Anaxagorean principle that the part of the soul called 'mind' is unmixed with the body.

However, at the same time, Aristotle is innovative in trying to make these principles fall under the universal laws of his natural philosophy, in order that they function as scientific explanations of psychological phenomena in the way idealised in the *Posterior Analytics*. Aristotle's attempt to be faithful to the psychological phenomena in this disciplined, scientific way, often results in his touching upon problems that anticipate later problems in the history of the philosophy of mind, such as the mind–body problem, the locality of the mind, and the nature and phenomenology of

⁴¹ *DA* 1.2, 405b11–12. On ἀρχαί as referring to objects and propositions, cf. Irwin (1988, 487, n. 6).

⁴² Axioms, hypotheses, and definitions all count as principles that can be used within demonstrations. See *APo* 1.2, 72a14–24; McKirahan (1992, 68–79).

conceptual thinking. This is why Aristotle's philosophy of mind does, and should, strikes us as strangely modern, and also why it is worth investigating anew from a philosophical developmental viewpoint.⁴³

0.5 The Advantages of the Alternative Story

For the most part, the justification for accepting this alternative story will rest upon the plausibility of the analyses of Aristotle's criticisms I offer in the following chapters, as well as the extent to which it is plausible to see them as providing the groundwork for the doctrines advanced in *DA* 2–3. However, there are a few advantages to accepting my story that can be pointed out immediately.

First, it helps to explain why Aristotle largely avoids using unnecessary dialectical *topoi* to criticise his predecessors and does not *ever* criticise them on the basis of doctrines drawn from the hylomorphic psychology of *DA* 2–3. It cannot be overemphasised that *DA* 1.2–5 contains not even a single reference to the notions of fulfilment (ἐντελέχεια) or activity (ἐνέργεια), nor even a reference to the body as potentiality.⁴⁴ Instead, Aristotle seems to presuppose only the reader's familiarity and acceptance of the doctrines of his works on natural science, such as the *Physics* and *On Generation and Corruption* (such as the doctrine of the four causes, and the doctrine of the unmoved mover, and the law-like relation that exists between agents and patients).

Second, it helps to explain why Aristotle's criticisms are usually waged from within his predecessors' own systems, so to speak, except when their psychological theories come into conflict with theses from his natural science. This suggests that he treats earlier psychologists as having offered hypotheses that are subject to scientific scrutiny, not as mere dialectical fodder.

It is also an advantage of my story that it is implied by an independently defensible view of the relation between Aristotle's treatises. This is Myles Burnyeat's thesis that these treatises were meant to be read, or at least understood, in a certain pedagogical order, such that backwards references to texts are to be understood as referring to philosophically prior topics, whose theorems are taken as established, and forward references to those which are posterior.⁴⁵ This would explain why, in *DA* 1.2–5,

⁴³ See Burnyeat (1992a).

⁴⁴ The closest Aristotle comes to this is when he describes Empedocles' *elements* as being analogous to material at *DA* 1.5, 410b11: ὅλη γὰρ ἔοικε τὰ γε στοιχεῖα.

⁴⁵ See Burnyeat (2004). I thank Malcolm Schofield for this suggestion.

Aristotle makes reference to (and feels able to use freely) theorems from the *Physics* and *On Generation and Corruption*, for instance, but not more sophisticated theorems about fulfilment and potentiality drawn from the *Metaphysics*. This would be the case if we assume that certain criticisms in the first book of *De Anima* were to be read (or justified by) theorems in the former two works, and not by theorems in (some books of) the latter. This explains, for instance, why Aristotle feels justified in appealing to the *Physics*' distinction between moved and unmoved movers to criticise the Platonic definition of soul,⁴⁶ but does not feel justified, in the whole of *DA* 1, to criticise any of his predecessors for *not* identifying the soul as a fulfilment, or a formal or final cause of the body. The assumption that Aristotle wants to give scientific criticisms of earlier Greek psychologies, and not just dialectically sufficient ones, explains this fact.

0.6 Limits of the Study

Since this work aims to discuss the contribution that Aristotle's criticism of earlier Greek psychology makes to his own psychology, and these criticisms are largely confined to *DA* 1, of necessity the analysis that follows focuses on this book. However, this work should not be confused with a commentary on *DA* 1, since its aim is not to comment on individual lines and sections of *De Anima* for general scholarly purposes. Instead, its aim is to establish the nature and fairness and of Aristotle's criticisms of earlier psychological views, and the philosophical role that these criticisms played with respect to the development of Aristotle's hylomorphic psychology. Hence, I do not discuss (except incidentally) Aristotle's puzzle in *DA* 1.1 concerning how the affections which are common to body and soul are to be defined,⁴⁷ nor his criticisms of Plato's *Timaeus*,⁴⁸ nor his puzzles in *DA* 1.4 about whether the soul is moved by its own affections, and whether destructive affections belong to mind.⁴⁹ Indeed, I have written this work because I could not find satisfactory answers within scholarly commentaries to the questions that I had as a younger scholar about the nature, fairness, and philosophical value of Aristotle's criticisms of earlier Greek psychological theories. This work attempts to ask, and answer, these questions directly.

⁴⁶ *DA* 1.3, 406a3–4.

⁴⁷ *DA* 1.1, 403a3–b19.

⁴⁸ However, see Carter (2017).

⁴⁹ *DA* 1.4, 408a29–b29. However, see Carter (2018).

In doing so, I have especially aimed to be as up to date and as thorough as possible in my interpretation of the Presocratics, both with respect to the contemporary scholarly literature and our best doxographical sources. However, I have had to be judicious in my citations. Since the study of the Presocratics is now a field in its own right (and justifiably so), some readers will no doubt find that I have been too quick to dismiss certain issues (e.g. that I have not discussed the Strasbourg papyrus enough), or that I have taken too strong a stance on others. However, I felt it best to discuss only those interpretative issues requisite for understanding how Aristotle arrived at his own interpretation of individual Presocratic thinkers, and for assessing whether his interpretations are justified. Sometimes, it is unmistakably true that Aristotle reconstructs a Presocratic view, or makes an imaginative leap, based upon a bare minimum of textual or oral evidence, or that he tries to fit such a view into the explanatory framework established at the beginning of his inquiry. However, just as often, he seems to draw upon a wealth of material that he knew about, but we do not,⁵⁰ and many of his interpretations often agree with our best contemporary scholarship (and *not* because scholars remain trapped in a Peripatetic interpretative framework from which they need to be freed). In my reconstructions of Aristotle's criticisms, I have also made efforts to draw attention to the analyses of the Greek commentators on *De Anima*, who are generally more insightful than modern scholarship has heretofore given them credit for.⁵¹ Their analyses of his criticisms also provide further evidence that Aristotle's treatment of earlier theories of soul is more than merely dialectical.

Finally, my discussion of Aristotle's criticisms of earlier Greek psychologies is limited to the thinkers that come up for serious treatment within *DA* 1.3–5. Hence, I shall not discuss, except incidentally, the psychological views of Thales,⁵² Diogenes of Apollonia,⁵³ Heraclitus,⁵⁴ or Alcmaeon,⁵⁵ nor the 'cruder' thinkers, Hippon⁵⁶ and Critias.⁵⁷ I shall also not discuss

⁵⁰ See Osborne (1987a, 9).

⁵¹ A possible exception to this is the *De Anima* commentary that has come down to us under the name of Simplicius, which is not by the same Simplicius who wrote the commentary on Aristotle's *Physics*. See Simplicius (1995, 2–10). It is nevertheless insightful in certain places. Cf. Simplic. *In de Anima*, 52.22–26.

⁵² See *DA* 1.2, 405a19–21.

⁵³ See *DA* 1.2, 405a21–5. However, see Chapter 9, Section 9.3.

⁵⁴ See *DA* 1.2, 405a25–8. See Schofield (1991b).

⁵⁵ See *DA* 1.2, 405a29–b1.

⁵⁶ See *DA* 1.2, 405b1–5.

⁵⁷ Cf. *DA* 1.2, 405b5–8.

those unnamed thinkers who based their theories of soul on etymological analyses.⁵⁸ In this I follow Aristotle, who seems to think that the psychological views of these thinkers are either not definite enough, or not important enough, to be worth criticising.

Despite these limitations, this work is the first of its kind in English to investigate the role that Aristotle's criticism of earlier Greek theories of soul plays in the development and justification of his own hylomorphic psychology.⁵⁹

0.7 Outline of the Study

The work is organised into four parts. Part I treats of methodological issues related to Aristotle's inquiry into the soul's scientific definition (Chapters 1 and 2). In Chapter 1, I propose a solution to Aristotle's puzzle about what method we should follow in order to discover the essential definition of soul. I call this the method of *scientific inquiry*. I argue that Aristotle casts earlier Greek psychologists as engaged in trying to explain the soul's basic *per se* attributes, and that for this reason, he views their theories as possible subjects of scientific criticism. To carry out this criticism, I argue, Aristotle advocates using a simple test by which to judge definitions of an entity under investigation, which I call the demonstrative heuristic. This heuristic consists in using the tools of dialectic and deduction, as well as a critical form of imagination, to test the consequences of adopting competing definitions of an item whose nature is under investigation.

In Chapter 2, I argue that, in *DA* 1.3, Aristotle puts forward a further definitional requirement, that a scientific definition of the soul should include a description that explains the soul-body relation. I argue that Aristotle bases this idea on a general principle of his natural science, established in *On Generation and Corruption*, which I call the *Axiom of Causal Association*. Aristotle's extension of this principle to the case of the soul-body relation commits him to a view I call associative substance dualism, and puts pressure on definitions of the soul that cannot provide such a principle.

Part II treats of Aristotle's criticisms of earlier psychologies that attempt to explain the soul's ability to produce motion (Chapters 3–6).

⁵⁸ Cf. *DA* 1.2, 405b26–9.

⁵⁹ Cf. Danieli (1984), whose important work (in German) anticipates some of the theses advanced here.

In Chapter 3, I show how Aristotle appeals to the demonstrative heuristic to show that the Platonic definition of soul as a self-mover entails either that the soul will be one of the four material elements – which it cannot be – or that it will destroy itself during its motion. What Aristotle gains from this criticism of Plato is the idea that one cannot explain the soul's ability to be an efficient cause of the body's motion by treating it as a separate physical object with its own motion. Instead, Aristotle suggests that soul will need to be identified as itself an inner principle of the body, if it is to be a natural efficient cause of the body's local motion. This lays the groundwork for the soul's being a principle of efficient causality, in accordance with the *Efficient-Final Causal Thesis*.

In Chapter 4, I show how Aristotle appeals to his demonstrative heuristic to show that Democritus is able to provide a formal, but not adequate, explanation of both the soul's ability to cause the body to move and its ability to think. This is because he thinks Democritus lacks an explanation of our ability to have a stable form of cognition from which deliberated actions proceed. What Aristotle gains from this criticism is the idea that the soul's production of local motion, even if it involves mechanistic causes within the body, must also involve (at least in the case of humans) a free decision to move or to not move. The result of this criticism implies that the explanation of animal behaviour cannot be reduced, at least in humans, to a deterministic series of causal interactions, and hence, that Democritus' definition of the soul, which implies such a determinist account, is not scientific. The criticism of Democritus helps to show, indirectly, that the soul operates in an intentional way as both a final and efficient cause in the origination of the motion of animals, and thus negatively constrains Aristotle to adopt the *Efficient-Final Causal Thesis*.

In Chapter 5, I show how Aristotle appeals to his demonstrative heuristic in criticising the second head of the Platonic Academy, Xenocrates, for his inability to give a plausible theory of how the soul, defined as a self-moving number, can be instantiated in the body so as to move it. What Aristotle gains from this obscure set of criticisms is the idea that some kinds of formal entities, namely, mathematical forms, such as points and numbers, are not explanatory of the soul's motive powers or affections. This places a negative constraint on his theory of soul that leads him to affirm the *Hylomorphic Thesis*.

In Chapter 6, I argue that Aristotle suggests that the definition of soul as a harmony of bodily opposites nominally passes the requirement of providing a principle that explains the soul-body relation. However, by appealing to his demonstrative heuristic, he is able to show that no bodily,

arithmetical, or geometrical harmonic properties are explanatory of any of the soul's *per se* attributes. The results of this criticism, I argue, show that the soul's power to act as an efficient and formal cause of the body, like in the case of Xenocrates, cannot be explained by identifying soul with mathematical form or geometrical organisation, nor with an emergent entity whose existence is derived from the mixed elemental powers. What Aristotle takes over from the harmony theory, however, is the idea that soul is plausibly a kind of non-mathematical form or determiner (λόγος), and the idea that (some kinds of) soul and living body are likely to be existentially interdependent. By this criticism, Aristotle is negatively constrained to affirm the *Hylomorphic Thesis*.

Part III treats of Aristotle's criticisms of earlier psychologies that attempt to explain the soul's ability to produce cognition (Chapters 7 and 8). In Chapter 7, I show how Aristotle appeals to the demonstrative heuristic in scrutinising Empedoclean and other elemental theories of soul that try to explain the soul's ability to cognise. He does so in order to show that the law-like principle that 'like cognises like' is too limited to explain the extent of the soul's knowledge, and that it is inconsistent with the *Axiom of Causal Association*. What he gains from this criticism is the idea that the domain of what we can cognise extends beyond the domain of what the material or immaterial elements, operating by the cognitive likeness principle, could know. From this Aristotle infers that the soul cannot be reduced to the elements. However, by adding two important modifications to the principle that like cognises like, I show that Aristotle imports a version of Empedocles' likeness principle into his own hylomorphic psychology, which I call the *Refined Cognitive Likeness Axiom*.

In Chapter 8, I analyse Aristotle's account of Anaxagoras' doctrine of mind. I claim that while Anaxagoras is criticised for not explaining how mind is able to think its objects, his lack of explanation serves as the starting point for the development of Aristotle's own view that mind is a psychological power that possesses no actual properties in common with any material object. Aristotle's attempt in *DA* 3.4 to solve the problems that Anaxagoras' view poses proves crucial to the defence of the *Separability Thesis*.

Part IV discusses how Aristotle uses the problems that beset earlier attempts to explain the soul's ability to produce motion, cognition, and other psychological events, to solve two puzzles related to the nature of soul (Chapters 9 and 10). In Chapter 9, I argue that, in *DA* 1.5, Aristotle sums up the basic shortcomings of early Greek psychology by arguing that these theories are at best able to provide an explanation of *either* the soul's

power of perception, *or* its power to initiate the body's local motion, but not *both*. This criticism lays out the empirical groundwork for Aristotle's claim in *DA* 2.3 that there is no uniform entity called 'soul' in nature, but various kinds of soul associated with broad divisions in the animal kingdom. I argue that this discussion places a negative constraint on him to adopt the *Non-Uniformity Thesis*.

In Chapter 10, I show how Aristotle attempts to make an empirical advance over the Platonic theory that the soul has determinate spatial-parts in the body. What Aristotle takes over from this theory, I argue, is that the soul has parts, which exercise powers within the body, but these parts cannot be understood as spatial-parts. Aristotle's investigation of this puzzle results in the discovery that, while the soul does not have a determinate spatial structure, it does have a metaphysical structure. These discussions, I claim, place a positive constraint on him to adopt the *Part-Hood Thesis*.

In the conclusion, I assess the contribution that Aristotle's criticisms of earlier Greek psychology make towards establishing a science of soul, in the sense of justifying, and helping us to understand better, the *Hylomorphic Thesis*, the *Efficient-Final Causal Thesis*, the *Non-Uniformity Thesis*, the *Part-Hood Thesis*, and the *Separability Thesis*. These results, I argue, show that Aristotle's hylomorphic psychology is best understood as a dualistic one, which affirms that plants and non-human animals are constituted by interdependent substances, and that human beings are constituted by one dependent substance, the body, and one independent one, the rational soul.

Definition, Explanation and Psychological Inquiry

We must notice, however, the difference between arguments from principles and arguments towards principles. For indeed Plato was right to be puzzled about this, when he used to ask if the argument set out from the principles or led towards them – just as on a race course the path may go from the starting line to the far end, or back again.

Aristotle, *Nicomachean Ethics*, 1095a30–b1 (Trans. Irwin)

1.1 Introduction

Aristotle formulates the project of *De Anima* as an inquiry (ἵστορία)¹ that seeks to establish a science (ἐπιστήμη) of soul.² The beginning of that science, he claims, will be the discovery of the soul's essential definition. But how can we discover the soul's essence, or its essential definition,³ if we do not even know what sort of thing it is? This is the methodological problem that Aristotle faces at the opening of *DA* 1:

But even to lay hold of a trustworthy belief (τινα πίστιν) about it [*sc.* the soul's essence] is in every possible way one of the most difficult things to do. For, it being common to this investigation (ζητήματος) and to many others – I mean, the investigation into the essence (οὐσίαν) of something

¹ This term is closely associated with Aristotle's preliminary researches in the natural sciences, which furnish material to be used in scientific explanations. See *HA* 1.6, 491a11–13; *PA* 2.1, 646a9; *GA* 1.11, 719a9–11.

² *DA* 1.1, 402a1–4. I take this term, which Aristotle coins here for the first time, to be a form of knowledge that is equivalent to an ἐπιστήμη. Although understanding is also a good translation, in order to emphasise that the kind of knowledge that Aristotle had in mind is the scientific kind set out in the *Posterior Analytics*, in what follows, I translate both terms as 'science'. Cf. Burnyeat (1981); Bronstein (2016, 20).

³ In what follows, I take the terms 'essence', 'essential definition', and 'scientific definition' to be synonymous with one another.

and the what-it-is (τὸ τί ἔστί) – in this case there might appear to be some single method (μέθοδος) applicable to everything about which we wish to know (γινῶναι) the essence, just as [for knowing] the *per se* attributes (τῶν κατὰ συμβεβηκὸς ἰδίων)⁴ there exists demonstration (ἀπόδειξις), which implies that we ought to seek this same method. But if there is not a single common method for finding the what-it-is, our handling of the matter becomes even more difficult. For it will be necessary to ascertain for each individual thing in what manner (τρόπος) it should be investigated. But even if it were apparent whether we ought to proceed by a kind of demonstration (ἀπόδειξις τις)⁵ or division (διάρεσις), or even some other method, still, there will be many puzzles and perplexities about from what premises (ἐκ τίνων) we ought to begin our search.⁶ For there are different starting points (ἀρχαί) for different subjects,⁷ such as for numbers and for geometrical surfaces. (*DA* I.1, 402a10–22)

Aristotle's remarks reflect a serious methodological difficulty. In fact, the difficulty is so serious that it challenges the very possibility of discovering what the soul is. Call it Aristotle's methodological challenge. The challenge asserts that we cannot begin an investigation into the essence of the soul until we know the answer to two questions: (A) what is the proper *method* for discovering the essence of soul, and (B) what are the *starting points* or premises from which that method begins?

I begin by arguing that it is unlikely that Aristotle advocates either induction, dialectic, or division as complete solutions to this problem (Section 1.2). I then claim that we can reconstruct a better solution from Aristotle's general account in the *Prior Analytics* of how we come to grasp the preliminary starting points of a science, and from his account of the structure of scientific inquiry put forward in the *Posterior Analytics* (Section 1.3). I then show how Aristotle explicitly appeals to these scientific accounts as his own preferred solution to the problem of inquiry within *DA* I.1 and suggests that there is a demonstrative heuristic by which the inquiry can proceed (Sections 1.4–1.6). I then discuss the problem of incorporeality as it relates to this heuristic (Section 1.7). I go on to discuss

⁴ Here, Aristotle means the *per se* demonstrable attributes (τὰ καθ' αὐτὰ συμβεβηκτότα) of *APo* I.7, 75b1 and *APo* I.22, 83b19–20, which are necessary attributes that (eventually) will not feature in the definition of a subject, but can be demonstrated (*via* further known premises) from terms within the definition of that subject. See Hicks (1907, 177); Bronstein (2016, 48–50).

⁵ I read τις with MS Sy. See Torstrik (1863, 113); *Metaph.* B.2, 997a30–2.

⁶ In *Phys.* I.1, 184a19–25, Aristotle identifies those things from which (ἐκ τίνων) we gain knowledge of the elements and first principles of things as the items/premises which are more intelligible to us (ἐκ τῶν γνωριμωτέρων ἡμῖν) at the outset of an inquiry.

⁷ See *Metaph.* Δ.1, 1013a14–16.

the relationship between the demonstrative heuristic and other methods of inquiry available to Aristotle and conclude with a general discussion of what this method tells us about the nature of Aristotle's treatment of early Greek psychologies (Sections 1.8 and 1.9).

1.2 Potential Solutions to the Methodological Challenge

At first sight, it seems that Aristotle has blocked all possible ways of answering his methodological challenge. With respect to question (A), outside of the *De Anima*, Aristotle is clear that neither the philosophical method of demonstration (ἀπόδειξις),⁸ nor the Platonic method of division (διαιρέσις)⁹ – a method that features prominently in Plato's *Sophist* and *Politicus* – are sufficient, without some prior knowledge of a thing's *per se* attributes, for establishing an essential definition.

His remark about numbers and geometrical surfaces having different starting points reflects his worry about question (B). According to *APo* 1.7, because many of the starting points or principles of the individual sciences are peculiar to the genus the science concerns, one cannot use principles peculiar to one science to demonstrate the truths of another,¹⁰ unless one of these sciences is subordinate to the other.¹¹ Although Aristotle is deliberately vague as to what sort of ἀρχαί he has in mind here – namely, ultimate first principles, or preliminary starting points – his point is that, without a proper answer to (B), his psychological inquiry is in danger of making use of principles that belong to the wrong science, which would hinder the investigation. Since neither (A) nor (B) has an obvious answer, how then does Aristotle meet the challenge?¹²

Broadly speaking, scholars who think that Aristotle is able to meet the challenge split into three camps. The first camp holds that his starting point for discovering the soul's essential definition is ἐμπειρία, or

⁸ At *APo* 2.4, 91a12–b11, Aristotle rules out ἀπόδειξις as a method for proving a definition that figures as the conclusion of a demonstrative syllogism; he shows that all such attempts involve a *petitio principii*. At *APo* 2.6, 92a6–33, he also argues against the method of arriving at a definition through hypothesis. However, see *Top.* 7.3, 153a23–6.

⁹ *APo* 2.5, 91b12–92a5. See also Ward (2008).

¹⁰ *APo* 1.7, 75a38–b20.

¹¹ See *APo* 1.9, 75b37–76a2. However, Aristotle sometimes relaxes this condition for some sciences. See *APo* 1.13, 79a13–16. I thank Lindsay Judson for this point. For a more detailed discussion of Aristotle's theory of the subordinate sciences, see Peramatzis (2011, 64–70) and Distelzweig (2013).

¹² Ross (1961, 14) notes the problem, but offers no solution.

'experience', and that his method is ἐπαγωγή (commonly, though sometimes misleadingly, translated as 'induction').¹³ The second camp holds that his starting points are ἔνδοξα, or 'reputable opinions', and that his method is διαλεκτική, or 'dialectic'.¹⁴ A third camp holds that Aristotle's starting point is Aristotelian διαίρεσις, or 'division'.¹⁵

The problem is that none of these camps provides adequate housing for a scientific inquiry into essential definitions. On the one hand, Aristotle explicitly rules out induction as sufficient for establishing essential definitions in *APo* 2.7. He claims in this chapter that induction can at most show *that* a certain property belongs or not (ὅτι ἢ ἔστιν ἢ οὐκ ἔστιν), but not *what* something is (τί ἐστιν), which is the content of an essential definition.¹⁶ That induction cannot be Aristotle's sole method for discovering the soul's essence is even more apparent if, on another of Aristotle's construals,¹⁷ it is understood as syllogising through an extreme term (operating as a middle), rather than a correct explanatory middle term. Only the latter type of syllogising, he thinks, can be used in the construction of demonstrations and definitions.¹⁸

If we leave the inductionist camp in order to pay a visit to the dialectical camp, we find that the procedures for dialectical debate codified by the *Topics* and the *Sophistical Refutations* provide an even worse place for Aristotle's inquiry into the soul to flourish. The first reason is that, when Aristotle criticises earlier beliefs about the soul, he often appeals to

¹³ E.g. Hamlyn (2002, 77), who seems to think of the first principles gathered by induction to be the primary definitions used in scientific demonstrations. Cf. Hicks (1907, 179–80); Tricot (2010, 21).

¹⁴ So Rodier (1900, 43). This view is ultimately based upon an interpretation of *NE* 7.1, 1145b2–7, popularised by Owen (1961) and Mansion (1961b), and developed in various ways by Evans (1977); Barnes (1980); Nussbaum (1982); Irwin (1987, 1988); Pritzl (1994); Witt (1992); Baltussen (2000); Włodarczyk (2000); and Polansky (2007), among others. More recently, the interpretation of *NE* 7.1 as providing evidence of a universal method of dialectical investigation has been criticised by Frede (2012) and Shields (2013). Although *Top.* 1.2, 101a34–b4 might seem to suggest that dialectic must be the route to 'the first' (τὰ πρῶτα) among the principles of the individual sciences, properly read, Aristotle just means that dialectic especially uses the principles which are common to all science, e.g. the principle of non-contradiction, as Smith (1993) persuasively argues.

¹⁵ See Bronstein (2016). This method, however, assumes that the genus 'soul' must already have been proved to exist through dialectical argumentation before the division begins.

¹⁶ *APo* 2.7, 92a37–b1. This applies also to the form of ἐπαγωγή that Hamlyn (1976) takes as primary, which involves using examples of the sort: since *X* of kind *K* has a property *P*, and *Y* of kind *K* has a property *P*, then *Z* of kind *K* also has a property *P* (e.g. at *Top.* 1.12, 105a13–16). This form of ἐπαγωγή also only deduces a fact, not an essential definition.

¹⁷ *APr* 2.23, 68b15–37. It is controversial whether Aristotle had a unified view of ἐπαγωγή. See Ross (1949, 481–5); Hamlyn (1976); Engberg-Peterson (1979); McKirahan (1983).

¹⁸ Cf. Kosman (1973, 389).

principles or theorems established in his works on nature, or empirical discoveries from his own researches, in order to construct challenges to their views.¹⁹ However, the dialectical method described in these works is restricted to using premises which are reputable to ‘everyone, the many, or the wise’.²⁰ Hence, unless one counts principles established in Aristotle’s *own* natural philosophy, such as, ‘not everything that causes motion need be in motion’ as endoxic,²¹ in virtue of Aristotle recognising *himself* as wise, then he cannot be following this method when he appeals to such principles to argue against earlier Greek definitions of soul.²²

Second, if one affirms dialectic as Aristotle’s only method for criticising the wise, and assumes that philosophers automatically count as wise, the absurd consequence follows that whenever Aristotle syllogises on the basis of *any* other philosophical view, his argument will *always* be a species of dialectic (e.g. eristic, gymnastic, peirastic, didactic), and *never* a species of philosophical or scientific inquiry. However, it seems bizarre to say that Aristotle’s criticism of Democritus’ account of breathing in the *Parva Naturalia*,²³ or his criticism of Empedocles’ account of why plants grow,²⁴ *must* be dialectical, simply because their views might be classified as amongst the *endoxa*.²⁵

Given the unlikelihood that Aristotle would have acceded to the claim that every time he discusses and criticises a reputable opinion he is thereby engaged in ‘dialectic’²⁶ instead of a philosophical or scientific inquiry, he probably thought that there was a better criterion for an inquiry *to be* dialectical.²⁷ Fortunately, he offers us just such a criterion in the *Topics*: when someone deals with propositions and problems – whether *endoxic* or not – *not* with regard to truth, but with regard to opinion, then their way of proceeding can be considered dialectical; but if the converse, then philosophical.²⁸

¹⁹ For example: *DA* 1.3, 406a12–13; *DA* 1.3, 407b17–19; *DA* 1.4, 409a9–10.

²⁰ *Top.* 1.1, 100b21–23.

²¹ *DA* 1.3, 406a3–4.

²² Pace Polansky (2007, 83). However, see Bolton (1994, 106).

²³ *Resp.* 4, 471b30–472a18.

²⁴ *DA* 2.4, 415b28–416a9.

²⁵ See Freeland (1990, 76). Indeed, some of the opinions reviewed could hardly be reputable. The Orphic theory of the soul, for instance, was presumably believed by neither the many nor the wise.

²⁶ In *NE* 8.1, 1155b1–9, for instance, Aristotle refers to the statements about friendship given by Euripides, Heraclitus, and Empedocles, as ἀπορημάτα belonging to physics.

²⁷ Pace Baltussen (2000, 39, n. 35), this criterion cannot be simply that Aristotle uses a form of δοκέω. The term is used dozens of times by Aristotle in contexts that could not be dialectical, e.g. *Cat.* 4, 2a7; *HA* 1.1, 487b9.

²⁸ *Top.* 1.14, 105b30–1.

This criterion, moreover, Aristotle explicitly reaffirms as distinguishing philosophical argumentation from dialectical argumentation in the *Prior Analytics*,²⁹ and the *Posterior Analytics*:

If you are making deductions with regard to opinion and only dialectically (κατὰ μὲν οὖν δόξαν συλλογιζομένοις καὶ μόνον διαλεκτικῶς), then plainly you need only inquire whether the deduction proceeds from the most reputable propositions (ἐνδοξοτάτων) possible; so that even if there is not in truth any middle term for AB but there seems (δοκεῖ) to be one, anyone who makes a deduction through it [*sc.* the false middle term] has deduced something dialectically. But towards truth you must investigate from the things which actually belong (ἐκ τῶν ὑπαρχόντων). (*APo* 1.19, 81b18–23) [Trans. Barnes with modifications]

The criterion offered here for distinguishing between dialectical argumentation and philosophical argumentation is in part teleological. If we can judge Aristotle's arguments against earlier views of soul as being aimed at truth, and as starting with features of the soul which actually belong to it, then we have reason to believe that – whether *endoxa* are discussed or not – his method is philosophical; if, however, we find that his arguments only appeal to reputable opinions, and start from features of the soul that *seem* to belong to it, then we have reason to believe his method to be dialectical.

However, Aristotle tells us at the outset of *De Anima* that his inquiry into the nature of the soul is aimed at truth.³⁰ Thus, dialectic is not his sole solution to the methodological challenge. This result should not be surprising. As Jaap Mansfeld's extensive work on the doxographical tradition has shown, although certainly Aristotle and Theophrastus collected earlier δόξαι for the purposes of dialectical debate, more importantly, they also did so for the purposes of advancing inquiry into the correct solution of philosophical problems (προβλήματα). Minimally, this means that one cannot infer from the mere fact that Aristotle discusses earlier δόξαι (which he almost never calls ἐνδοξά) that such discussions are dialectical. There is no good reason then to deny that his review and criticism of earlier δόξαι about the soul has a scientific purpose.³¹

²⁹ *APr* 1.30, 46a3–10.

³⁰ *DA* 1.1, 402a4–5.

³¹ See Mansfeld (1990, 3199); Mansfeld (2010, 37–8); Warren (2007, 4–5). This claim raises the question of the status of Aristotle's review and criticisms of earlier Greek thinkers in other works of his corpus. Some of these introductory books, e.g. *Metaphysics* A and *Phys.* 1, are structurally similar to *DA* 1 insofar as they present reviews and criticisms of earlier philosophical views. However, they also present marked differences in their treatment of earlier philosophical views. *Metaph.* A, for instance, uses the theories of earlier thinkers to present a *philosophy of history*

A final reason to leave the dialectical camp is that, in Aristotle's review of earlier beliefs about the soul, he neither describes them as amongst the ἐνδοξα, nor as beliefs which need to be saved or reconciled in the manner suggested in *NE* 7.1. The terms ἐνδοξον and ἐνδοξα, in fact, are conspicuously absent from the whole of *De Anima*, just as they are from all of Aristotle's works on nature, with the single exception of *De Caelo*.³² We also have evidence that Aristotle drops this term for a reason; in his works on nature, he also stops using the verb, 'to argue dialectically' (διαλέγεσθαι).³³

It is telling that, of the ancient commentators, Philoponus uses the term ἐνδοξός only once in his commentary on *De Anima* (at *In de anima*, 182.11–14), to agree with Alexander of Aphrodisias' classification of but one of dozens of arguments in *DA* 1.3–5.³⁴ In his commentary, Simplicius refers to what is ἐνδοξον only twice. Both occur in the space of a few lines (at *In de Anima*, 15.17–22) as a description of the building blocks of dialectical, as opposed to real, definitions. The term is completely absent from Themistius' *Paraphrasis in de Anima*. Sophonias (at *In Aristotelis De Anima*, 121.27) uses it only once, in the plural, to refer to the 'endoxic premises' of syllogisms that do not reach their conclusion through a middle term.

The misimpression that Aristotle refers to ἐνδοξα across his philosophical works on nature is the fault of G.E.L. Owen, who, in his groundbreaking, but in many ways misleading, 1961 article, wrongly implies – at least four times – that Aristotle uses this term in places where it is absent.³⁵

that justifies Aristotle's specific views on the four causes as its highest development. See Barney (2012). *Phys.* 1, in contrast, uses the theories of earlier thinkers to discover the *first principles* of a science of nature by discovering what is common to all of them (e.g. that the contraries are principles of nature). See Quarantotto (2018b). In contrast to both of these uses of doxographic material, in *DA* 1, Aristotle uses earlier theories as a means of discovering the *definition* of a particular entity, the soul, in a way that explicitly appeals to the *Posterior Analytics*' technical accounts of knowledge, demonstration, and definition. Aristotle's procedure in *DA* 1 finds its best analogues in other attempts to define specific unknown items (e.g. time, in *Phys.* 4.10–14). See Coope (2005), whose analysis of Aristotle's attempt to work out the definition of time presupposes that he uses earlier beliefs about it for scientific rather than for dialectical purposes.

³² *DC* 3.4, 303a22. This is noted by Frede (2012, 196–7).

³³ And when he does use it, e.g. in referring to the way he will criticise the Eleatics in *Phys.* 1.1, 185a19–20, it is to draw attention to the fact that his arguments will be semantic, and not scientific in nature.

³⁴ See Chapter 7, Section 7.3.

³⁵ Owen incorrectly implies its appearance in *Phys.* 4.4, 210b32–4; *Phys.* 4.4, 211a4–6, and *Div.* 462b14–18. However, none of these instances are as misleading as the dual quotation he assigns to *NE* 7.1, 1145b6–7 and *Phys.* 4.4, 211a7–11. He states (1961, 88): "For if the difficulties are resolved and the ἐνδοξα are left standing", as Aristotle says in both the *Physics* and the *Ethics*, "this in itself is a sufficient proof".

Fortunately, we can readily accept Owen's basic claim – that some (but not all) *endoxa* count as phenomena which stand in need of explanation, and *vice versa* – whilst rejecting the idea that, for an inquiry to be dialectical, it is sufficient that beliefs that might be characterised as *endoxic* are reviewed and/or criticised.³⁶

Finally, Aristotle's discussion in *APo* 2.13 about the usefulness of division in helping one discover items predicated in the what-it-is of a *definiendum* gives us a reason to leave the division camp. This method can be used only when one has already collected, through experience and induction, (a) the genus of the *definiendum* (e.g. number), (b) whether or not the *definiendum* is an *infima species* (e.g. pair and triplet), and (c) the *per se* attributes (or differentiae) of the *infima species* which together do not belong to any item other than the *definiendum*. Thus, the method of division is useless to Aristotle as a *starting point* of psychological inquiry until he identifies at least some *per se* attributes of soul, and a genus from which a division could begin. As we shall see, Aristotle will use his prior knowledge of the soul's *per se* attributes as a means of *coming to know* the soul's genus.

1.3 Aristotle's Solution to the Methodological Challenge

Since induction, dialectic, and division are neither singly or jointly sufficient for solving the methodological challenge, we need to establish a new camp that has the resources to answer to both (A) and (B). Our first help in forming this camp comes from the *Prior Analytics*. There Aristotle writes:

But most of the principles are peculiar (ἴδια) to each science. For this reason, it is from experience (ἐμπειρίας) that the principles (ἀρχάς) for each science are provided; I mean, astronomical experience provides the principles of astronomical science (ἐπιστήμης); for when the phenomena (φαινομένων) have been sufficiently grasped (ληφθέντων), then the astronomical demonstrations (ἀποδείξεις) were discovered. This holds similarly of any art or science in general. So that, if the attributes (τὰ ὑπάρχοντα) belonging to each subject are grasped, we will already be prepared to exhibit the demonstrations. For if none of the attributes which truly belong (ὁληθῶς ὑπάρχόντων) to the things are left out by the inquiry (ιστορίαν), we will be in a state (ἔξομεν) to discover the demonstrations of whatever can be demonstrated, and to make apparent (ποιεῖν φανερόν) the things of which there is by nature no demonstration. (*APr* 1.30, 46a17–27)

³⁶ I thank Daniel Graham for pressing me on this point.

From this passage, we can see that the inductionist camp has the right answer to (B).³⁷ Since Aristotle holds that perceptual processes produce forms of experience that serve as the foundation for the starting points of different sciences, it must be the case that, if there is to be a science of soul, its starting points must come from these same processes.³⁸

However, we can also see that this camp does not furnish the right answer to (A). Although one might think that this passage suggests that the method for discovering essential definitions (if we view these as ultimate first principles) is none other than simply forming experiences, in fact, the principles that Aristotle is discussing here are *not* the ultimate definitions of a finished science (for example, the essential definition of ‘star’, or ‘soul’).

Instead, the principles that Aristotle thinks are provided by ἐμπειρία are *preliminary accounts* or *identifying descriptions* that we collect about a subject or attribute we are investigating. These are propositions about τὰ ὑπάρχοντα or ‘inhering attributes’ belonging to a particular *explanandum*. Expressed as propositions, where P is an attribute, and S is a subject, they take the form: ‘P belongs_{per se} to all S’.³⁹

These principles are not *essential* definitions. Instead, these principles provide the starting point on the way to finding an essential definition, by helping to establish ‘the fact that’ (τὸ ὅτι) certain features hold of an item always or for the most part, but not *why* those features hold.⁴⁰ To obtain scientific knowledge of a subject, in contrast, is to grasp an explanatory account of *why* such preliminary accounts hold always or for the most part.⁴¹

This implies that the solution to (A) will be found in Aristotle’s work on scientific knowledge and explanation – the *Posterior Analytics*.⁴² In it, Aristotle describes the process by which we can arrive at an essential definition of something. In general, Aristotle argues that, once we know the meaning of some natural kind term S *via* a preliminary or nominal account of what it is, and we confirm that the referent of S exists,⁴³ and

³⁷ Pace Irwin (1987, 132, n. 15), who interprets this passage as applying only to empirical inquiry, and denies that the reference in *DA* 1.1, 402a4 to a *historia* of the soul implies that the *DA* is a work of *historia*.

³⁸ *APo* 2.19, 100a3–9. See also *Metaph.* A.1, 980b25–982a3.

³⁹ *APr* 1.30, 46a5. See Bronstein (2016, 88).

⁴⁰ See *APr* 1.30, 46a17–27; *APo* 2.8, 93a21–9; *NE* 1.4, 1095b7.

⁴¹ Such facts fall under what Ferejohn (1991, 60) labels the ‘pre-syllogistic framing stage’ of a science. See McKirahan (1992, 212–13).

⁴² See Bolton (1991).

⁴³ See Charles (2005, 34–40).

have collected – through observation, experience, and induction – certain attributes that belong to that thing of necessity, for example, that (ὅτι) an attribute *P* belongs (always or for the most part) to *S*, we can go on to inquire into the reason why (τὸ διότι) *P* belongs to *S*. Aristotle thinks that, once we are in a position to know the cause or explanation (αἰτία/αἴτιον) of *why* *P* belongs to *S*, we are then in a position to provide an explanation of the fact *that* *P* belongs to *S*, expressed in the form: *P* belongs to all *S* because of cause *M*.

Once we know *whether* *S* exists as a natural kind, and *that* *P* belongs to all *S*, we can go on to learn *why* *P* belongs to all *S*. Once we do so, we learn either:

- (1) What *P* is, i.e. the definition of *P* (if *P* turns out to belong_{per se} but not belong_{def} to *S*),

OR

- (2) What *S* is (in part or in whole) (if *P* turns out to belong_{per se} to *S* *because* *P* belongs_{def} to *S*).⁴⁴

Aristotle's example of how one arrives at an essential definition of thunder gives an example of learning what *P* is.⁴⁵ He begins by giving an example of a thing whose existence can be confirmed by experience: 'Thunder is a noise in the clouds'. This, Aristotle thinks, is a kind of definition, insofar as it grasps *something* of the what-it-is of thunder (namely, that it is a species of sound, and that it exists, when it takes place, in the clouds). However, this is not its full essential or scientific definition.⁴⁶ In order to find out the scientific definition of thunder, he argues, we must discover a middle term that gives the reason why (διὰ τῆς) *P* (noise) belongs to all *S* (clouds of a certain sort).

To do this, he says, we should look amongst the known facts we have collected from experience and find preliminary accounts that can help to explain the phenomenon of 'noise in the clouds'. If one finds such accounts (e.g. that 'quenching of fire belongs to clouds', and that 'noise belongs to

⁴⁴ I thus accept, in basic form, what David Bronstein calls the 'explanationist' picture of acquiring essential definitions, in contrast to the 'intuitionist' picture, and Bronstein's own 'Socratic picture'. See Bronstein (2016, 108–20). My reason for rejecting the last option is that both Plato and Aristotle, it seems to me, reject the Socratic picture in favour of something like the method of hypothesis.

⁴⁵ Cf. Ackrill (1981); Landor (1981); Bolton (1987); Ferejohn (1991); McKirahan (1992); Goldin (1996, especially 101–36); Charles (2005); Deslauriers (2007); Chiba (2012).

⁴⁶ *APo* 2.8, 93a21–4. See *APo* 2.10, 94a11–14, and Bolton (1987, 143–6).

quenching of fire') one can then begin to construct a demonstrative explanation of *why* it thunders. Aristotle argues:

What is (τί ἐστὶ) thunder? A quenching of fire in the clouds. Why (διὰ τί) does it thunder? On account of (διὰ) fire being quenched in the clouds. Let 'cloud' = *C*, 'thunder' = *A*, and 'quenching of fire' = *B*. *B* exists in *C*, cloud (because the quenching of fire is *in* cloud). *A*, noise exists in *B*. And *B* is the account of the first extreme, *A*. (*APo* 2.8, 93b7–12)

The most important aspect of this passage is that it shows that the phenomenon that we start with in order to investigate what something is, namely, that thunder/noise belongs to the clouds, eventually figures as the *conclusion* of a demonstrative syllogism once we find an explanatory middle term. Scientific inquiry thus works by looking for *M* principles in the *upward* direction. We can see this more readily once the argument is laid out in syllogistic form:

1. [A] Noise belongs_{per se} to [B] quenching of fire.
2. [B] Quenching of fire belongs_{per se} to [C] cloud.
3. [A] Thunder/Noise belongs_{per se} to [C] cloud.⁴⁷

Aristotle claims that if this sort of demonstration contains the correct middle or [B] term (here, 'quenching of fire'), then this syllogism *is* a sort of demonstration of the what-it-is (here, of the major or [A] term, 'thunder'). Such a definition of the what-it-is differs from a demonstration only in the position of its terms.⁴⁸ The different position of the terms of is simply: 'Thunder =_{def} [A] the noise caused by [B] the quenching of fire which belongs to [C] clouds'.

Aristotle's discussion of how we might arrive at a definition of *soul* is an example of learning what *S* is. In *APo* 2.8, he claims that as soon as we know an attribute of soul, such as 'it moves itself', we will know at the same time that soul exists, and be in possession of a preliminary account that, just like 'a certain noise in the cloud', can figure in the conclusion of a demonstrative syllogism.⁴⁹ In this case, we would search for preliminary accounts containing a middle term that, in virtue of identifying

⁴⁷ Aristotle conflates the terms 'noise' and 'thunder' here, I take it, because the phenomenon referred to as 'thunder' belongs (according to the explanation given) to a *subset* of the kinds of noises that can be made by the quenching of fire, namely, the kind that belongs to clouds. Cf. Bronstein (2016, 152).

⁴⁸ *APo* 2.10, 93b38–94a5.

⁴⁹ See *APo* 2.8, 93a21–9.

the nature of soul, would help to explain *why* being in self-motion would belong to it. In inquiring, we would seek to find a middle term M that fit the following syllogism:

1. [A] Being a self-mover belongs_{per se} to [B] M.
2. [B] M belongs_{def} to [C] soul.
3. [A] Being a self-mover belongs_{per se} to [C] soul.

If, however, it turned out that, amongst our collection of accounts about things in motion, there was *no* M to which self-motion belonged other than soul, and there was no soul without self-motion, we would be justified in inferring that being a self-mover belongs_{def} to soul.

In constructing all such explanatory accounts, however, Aristotle believes that philosophical or empirical testing is needed to verify that our M premises are (a) true, (b) primary, (c) immediate, (d) better known than, (e) prior to, and (f) explanatory of, our demonstrative conclusions.⁵⁰ It is also the case that the *preliminary accounts* that figure in our conclusions must themselves be true, and have explanations which are prior to and better known than they are.

Understanding how Aristotle thought of the verification of M premises is crucially important for understanding his explanationist picture of demonstration. For him, we can verify an M premise by testing out whether it coheres with the rest of our scientific knowledge about the world. His putative demonstration that thunder belongs to the clouds in virtue of the middle term 'quenching of fire', in fact, provides an example of how to find out if an M premise meets all of the above requirements. The claim that thunder is a quenching of fire that belongs to the clouds derives, as Aristotle tells us in the *Meteorology*, from Anaxagoras.⁵¹ There, after being subjected to more rigorous questioning, Aristotle rejects the middle term hypothesised in the *Posterior Analytics* – 'quenching of fire' – on the grounds that we lack a good preliminary account of why fire would be in the clouds in the first place. However, according to Aristotle's natural science, dry exhalation, unlike fire, *is* naturally able to be in clouds.⁵²

⁵⁰ *APo* 1.2, 71b17–25. Aristotle's theory of science does not follow a deductive–nomological model. See Brody (1972). Thus, although 'being near' to earth and 'not-twinkling' are co-extensive properties of planets that are nomologically deducible from one another, 'being near' is the property explanatory of 'not-twinkling', and not *vice versa*. See *APo* 1.13, 78a30–8.

⁵¹ *Meteor.* 2.9, 369b14–19 = DK59 A84 = TEGP 50.

⁵² See *Meteor.* 2.9, 369b11–370a33.

Thus, he implies that a more plausible definition of thunder would be: ‘thunder=_{def} the [A] noise caused by [B] the ejection of dry exhalation (ἀναθυμίασις) in [C] condensed clouds’.

Aristotle’s revised account of his earlier definition of thunder shows that we can challenge purported explanations of why P belongs to S both in the upward direction (in terms of other accounts that their M premises/explanations presuppose), and in the downward direction (in terms of the consequences that follow from these M premises/explanations).

This strongly suggests that the status of the second M premise in Aristotle’s original explanation – quenching of fire belongs to cloud – must be hypothetical. If so, then Aristotle is also comfortable with the idea that, in searching for a definition, not every preliminary account need be an established fact that is either prior or posterior to another fact: some preliminary accounts, Aristotle allows, are hypothetical, i.e. believed (but not known) to be facts, and as such, need to be verified.

Aristotle claims that this method of inquiring into essential definitions, namely, the method of seeking middle terms that explain our preliminary or identifying accounts (gathered *via* induction) of a given attribute P or subject S, is universal.⁵³ In summarising the four ways he thinks we inquire, namely, by asking (1): *whether* some S exists; (2) *what* S is, (3) *whether* an attribute P belongs to S; and (4) *why* P belongs to S,⁵⁴ Aristotle concludes:

It happens, therefore, that in *all* our inquiries we inquire either if there is a middle term or what the middle term is. For the middle term is the cause (αἴτιον), and this is what is sought in all cases. (*APo* 2.1, 90a5–7)

If this is right, then Aristotle’s method in seeking to define the soul in *De Anima* will be identical to, or a version of, this method of inquiry.⁵⁵ If so, he should begin by accepting a certain preliminary account of soul, that P (Q, Y, etc.) belongs_{per se} to soul (e.g. ‘being self-moving’) which has been ascertained by induction or taken from hypotheses about inductively

⁵³ See *APr* 1.30, 46a3–10.

⁵⁴ *APo* 2.1, 89b24–35.

⁵⁵ I take this to be very close to the view that Chiba (2012) calls ‘heuristic demonstrative inquiry’. The latter method may also be seen as equivalent to what Freeland (1990, 90) calls Aristotle’s ‘abductive’ method, which ‘involves arguing from explanatory success to the truth of a scientific theory’. A closely related view is the logical-physical method of inquiry that Cleary (1994) proposes. Cf. Reeve (2017, xxxiv–xliv) who proposes a similar view about arriving at ‘starting-points’, which, I think, fails to account for the importance of middle-terms in Aristotle’s theory of scientific knowledge.

gathered material. Then, he should collect other accounts, or 'principles' concerning the soul that purport to provide explanatory middle terms for those accounts.⁵⁶ If these explanatory accounts, after being put to a philosophical test, *do* turn out to provide *explanantia* of why P (Q, Y, etc.) belongs to soul, it will be so either because:

(1) P belongs_{def} to all soul because there is no M for P,

OR

(2) P belongs_{per se} to soul because of M.

In the former case, the definition of soul will become clearer as inquiry progresses because it will turn out that P (Q, Y, etc.) are themselves M terms for other *per se* attributes of the soul, but cannot be demonstrated from any *higher* M account. In other words, P will turn out to be an immediate and indemonstrable first principle belonging to the essence of the soul.

In the latter case, the definition of soul will become clearer as inquiry progresses because the accounts which demonstrate *why* P (Q, Y, etc.) belongs to soul will themselves need to contain M terms which are part of the soul's essence. As we shall see, this in fact is Aristotle's procedure in *De Anima*. Hence, he lives in a third, scientific camp whilst investigating earlier Greek psychology. Scholars who still wish to defend the view that Aristotle's method of obtaining scientific knowledge of a definition in his works on natural philosophy is 'dialectical', I think, owe us a clearer account of the relationship between the theory of definition Aristotle holds in the *Topics*, and the theory of definition he has in the *Posterior Analytics*.

1.4 The Method of Scientific Inquiry in *De Anima* I

Why then does Aristotle not just come out and say that this scientific method of inquiry is his solution to the methodological challenge? In fact, he *does* say so. The difficulty in seeing his solution is a result of the fact that, before he answers the challenge, he overwhelms his readers with a series of puzzles that psychology should aim at answering,⁵⁷ two of which receive an answer in *DA* I,⁵⁸ and the rest of which receive answers in *DA* 2–3.⁵⁹

⁵⁶ See McKirahan (1992, 212–13).

⁵⁷ *DA* I.1, 402a23–b16.

⁵⁸ See Chapters 9 and 10.

⁵⁹ Whilst the first of these puzzles does seem to be a methodological suggestion about how one might proceed, it is rejected at *DA* I.1, 402b16–17.

However, as the ancient commentators recognised,⁶⁰ a close analysis of *DA* 1.1 shows that, after presenting these intervening puzzles, Aristotle once again picks up the thread of the methodological challenge at *DA* 1.1, 402b16, and gives his solution to it.⁶¹ He argues:

But it seems that not only is it useful to know (γινῶναι) the what-it-is in order to gain theoretical insight into the causes (τὸ θεωρῆσαι τὰς αἰτίας) in the substances (οὐσίαις) of the *per se* attributes (συμβεβηκότων) – just as in the mathematical sciences, what straightness and what curvature is, or what a line or what a geometrical surface is, is useful for discerning [the *per se* attribute of] how many right angles the angles of the triangle are equal to,⁶² but also conversely, [to know] the *per se* attributes contributes in great part to the scientific knowledge (τὸ εἰδέναι) of the what-it-is; for whenever we are in a state such as to give an explanation (ἐχῶμεν ἀποδιδόναι)⁶³ concerning the *per se* attributes, either all of them or most of them, in accordance with imagination (κατὰ τὴν φαντασίαν),⁶⁴ then we shall be able to speak most correctly (κάλλιστα) about the essence (οὐσία); for the first principle of demonstration is the what-it-is; so with respect to those definitions (δρισμῶν) which neither result in our coming to know (γνῶριζειν) the *per se* attributes, nor easily produce a likely guess (εἰκάζειν) about them, it is clear that they have been spoken dialectically (διαλεκτικῶς) and all of them are empty (κενῶς). (*DA* 1.1, 402b16–403a2)

The difficulty in solving the methodological challenge, Aristotle now reveals, is the mistaken assumption that one must have in hand specific knowledge of *what* the soul is (e.g. its categorial genus), before one can know any of its properties – an assumption that raises a version of Meno's paradox.⁶⁵

⁶⁰ See Philop. (*In de anima*, 40.7–41.10). Although he does not give Aristotle's method a label, he gives as examples of its use Aristotle's procedure in the *Physics* for defining place, the infinite, the void, and time, and in the *Meteorology*, a hailstorm. Themist. (*Paraphrasis in de Anima*, 2.20), strikes a more intuitionist note, and labels Aristotle's method σύνθεσις, by which he means an act of the intellect which is able to judge that properties necessarily belong to a subject (τὸ ὑπάρχον τῷ πράγματι ὡς ὑπάρχον), e.g. 'Snow is white' (*Paraphrasis in de Anima*, 109.26–110.4).

⁶¹ This line is logically connected back to *DA* 1.1, 402a22. Aristotle's claim here is not connected to the question posed at *DA* 1.1 402b14–16, whether we ought first to investigate the objects which the powers of soul are correlated with, or the powers themselves.

⁶² See McKirahan (1992, 72). Here, as in *APo* 2.2, 90a9–13, Aristotle treats mathematical objects such as triangles as (secondary) substances.

⁶³ For this epistemic use of εἶναι see *APo* 2.8, 93a28–9, and *APr* 1.30, 46a17–27. See Bolton (1987, 132, n. 26).

⁶⁴ On this function of imagination, see D. Frede (1992, 286). Cf. *Insomn.* 2, 460b18; *DA* 3.3, 428b3.

⁶⁵ See Ferejohn (1988) and Burnyeat (1981).

In the *Meno*, Socrates claims that he cannot know what sort of thing virtue is (in the first case, whether it teachable or not), because he does not know at all what virtue is (ὅτι ποτ' ἐστὶ τὸ παράπαν).⁶⁶ Progress occurs when Socrates allows Meno to begin to investigate what *sort* of thing virtue is by means of the method of hypothesis *before* he knows *what* virtue is.⁶⁷ For instance, he allows that virtue is the sort of thing that is necessarily good, in order to test whether this is consistent with it being the sort of thing that is teachable, and he allows Meno to test whether the hypothesis that virtue is teachable is consistent with there being no teachers of it. By offering the method of hypothesis as the way forward, Plato implicitly rejects the priority of the *what-is-it* question in favour of the priority of the *what-sort-of-thing-is-it* (hypothetically) question.⁶⁸

Aristotle inherits Plato's suggested solution to the paradox. For this reason, his initial remark at *DA* 1.1, 402a23–4, that we should perhaps (ἴσως) first locate what the genus of soul is in the sense of its *what-it-is*, turns out to be a provocation which he does not pursue until *DA* 2. Instead, in the above passage, he solves the methodological challenge by claiming that we are able to make progress into what soul is, or its proper genus and differentia, by seeing how well *proposed* definitions of its genus and differentia facilitate scientific knowledge of, or guesses at, its apparent *per se* attributes.⁶⁹

In what follows, I shall call this Aristotle's *demonstrative heuristic*. This heuristic, which tests *whether* a definition facilitates knowledge of the *per se* attributes of an entity, is absent from the *Topics* and the *Sophistical Refutations*.⁷⁰ This is because it is a procedure that tests out *whether* a definition is scientific, or empty and dialectical. Aristotle's affirmation that we should use the demonstrative heuristic in order to make progress towards a science of soul confirms that his chosen method of inquiry is either identical to or closely related to the scientific method of inquiry he

⁶⁶ *Men.* 71a6–7.

⁶⁷ *Men.* 86d3ff. Cf. Wilkes (1979); Benson (2003); Wolfsdorf (2008).

⁶⁸ We see this method at work in Plato's later dialogues, such as in the *Republic*, where the attributes of justice are established long before the definition of justice is revealed.

⁶⁹ Pace Polansky (2007, 49), who thinks that this passage does not represent a shift in procedure whereby we first investigate *per se* attributes. Beginning from the *per se* attributes (τὰ συμβεβηκότα) of a kind before having a definition of the specific kind itself is also recommended in the *Parts of Animals*. See *PA* 1.1, 640a13–15. *PA* 1.5, 645a36–b3: Ἀναγκαῖον δὲ πρῶτον τὰ συμβεβηκότα διελεῖν περὶ ἕκαστον γένος, ὅσα καθ' αὐτὰ πᾶσιν ὑπάρχει τοῖς ζώοις, μετὰ δὲ ταῦτα τὰς αἰτίας αὐτῶν πειρᾶσθαι διελεῖν.

⁷⁰ See Bolton (1987, 147–8).

puts forward in the *Posterior Analytics*. If so, taken as whole, Aristotle's inquiry into the nature of soul should:

- (1) Establish (through perception, experience, and induction) that soul, *S*, exists as a natural kind.
- (2) Collect preliminary accounts, $A_1, A_2 \dots A_n$, of *S*'s *per se* attributes, *P*, *Q*, *Y*, etc. (e.g. $[A_1] = P$ belongs_{per se} to *S*).
- (3) Select preliminary accounts and hypothetical definitions, $D_1, D_2 \dots D_n$, that are prior to, and purportedly explanatory of, other preliminary accounts, $A_n, \dots A_z$. (e.g. $[D_1] = Y$ belongs_{def} to *S*).
- (4) Test whether $D_1, D_2 \dots D_n$, in conjunction with one's background scientific knowledge, facilitate demonstrations, or likely inferences that accord with imagination, of why *P*, *Q*, *Y*, etc. belong_{per se} to *S*.⁷¹

Appropriately, Aristotle structures his inquiry in *DA* 1.2–5 in accordance with each of these four steps. Steps (1) and (2) are carried out at the beginning of *DA* 1.2 when he writes:

In investigating the soul, whilst going through the puzzles (διαποροῦντας) which are to be solved (εὐπορεῖν) as we proceed,⁷² it is necessary at the same time to take into account the earlier opinions (δόξας) of as many of those who have stated something about soul, so that we may adopt what has been said correctly (καλῶς), and avoid what has not been said correctly. But the starting point (ἀρχή) of the investigation (ζητήσεως) is to lay out the attributes which appear to belong most of all to the soul by nature (τὰ μάλιστα δοκοῦνθ' ὑπάρχειν αὐτῇ κατὰ φύσιν). Animate things appear to differ most of all from inanimate things in two ways, both by motion (κινήσει) and in perceiving (αἰσθάνεσθαι). We have taken over from our predecessors roughly (σχεδόν) these same two attributes concerning the soul. (*DA* 1.2, 403b20–8)

In fulfilment of step (1), Aristotle accepts that we already know that there is a subject kind called 'soul' that accounts for why some objects in the world are alive, and other objects are not. In fulfilment of step (2), he claims that the starting points of the investigation are that the production of motion and the production of perception are attributes that belong to the soul by nature, since these attributes mark out the distinction between living and non-living things upon which the existence of soul is based.

⁷¹ See Kosman (1973, 387).

⁷² It should be emphasised here that Aristotle distinguishes between: (i) going through the puzzles, and (ii) reviewing the predecessors' opinions. This distinction is not only evident in the seemingly *a priori* list of puzzles provided in *DA* 1.1, but it is also borne out in *DA* 1.3–5, where it is clear that not all predecessor opinions generate puzzles.

Thus, the preliminary first principles that Aristotle accepts are *that* (i) the production of motion in animate things belongs to soul,⁷³ and *that* (ii) the activity of perception in animate things belongs to soul. These preliminary accounts of soul, in fact, serve as the 'starting points' asked for by question (B) of the methodological challenge. These are premises *from* which an inquiry into the essential definition of soul can begin its upward explanatory ascent. The inquiry into the soul's definition will now take the form of asking *why* these attributes belong to the soul, i.e. what is the middle term contained in the definition of the soul's essence from which (*via* other premises), these attributes can be shown to belong to the soul *per se*, or, with which (under another description) they are identical to.

There is also a reference here to steps (3) and (4). Aristotle claims that we should both gather statements about the soul from earlier thinkers, and take into account the extent to which they spoke correctly and incorrectly about it. Yet, how could this correctness be tested without Aristotle (and his readers) already knowing the soul's essential definition? Aristotle's demonstrative heuristic provides an answer: insofar as an earlier psychological account is able to explain the soul's production of motion and perception, affirmed by the *preliminary accounts* of the soul's attributes collected at step (2), it can be judged as revealing the soul's essence correctly. Insofar as it is not able to do so, it can be judged as dialectical and scientifically empty.⁷⁴ Below, I shall argue that Aristotle's discussion of earlier theories of soul casts them as explanatory in nature and represents a fulfilment of step (3). I shall then argue that his criticisms of those theories, some which involve a discussion of puzzles (ἀπορίαι) about their views, overtly appeal to the demonstrative heuristic, and represent a fulfilment of step (4).

⁷³ The soul's ability to move and direct the body locally from one place to another is never in doubt in *DA* I; it is only the *way* in which soul asserts its control over the body that is ever in question. Cf. *DA* I.4, 407b34–408a1; *DA* I.4, 408a32–33; *DA* I.4, 409a16–17; *DA* I.5, 411a29.

⁷⁴ Someone might wonder, however, what Aristotle takes to be the relationship between definitions which turn out to be said 'dialectically' and are 'empty', and definitions offered by the 'dialectician' (ὁ διαλεκτικός), who defines psychological affections such as 'anger', by mentioning the form of anger – 'desire for revenge' but not the material changes associated with this form (*DA* I.1, 403a29–31). I take it that Aristotle's puzzle about who the natural scientist (ὁ φυσικός) is has as its conclusion the idea that *both* the (Platonic) dialectician, *and* the Presocratic 'natural scientists', offer definitions of psychological affections which end up being 'dialectical and empty' to *some degree*, insofar as the former cannot derive the material consequences of psychological affections in the body, and the latter cannot derive the formal ones. Both sorts of definitions then, for different reasons, can be considered as partially 'dialectical and empty', in the sense that neither can derive, in an explanatory way, the relevant psychological phenomena. See *DA* I.1, 403a19–24.

1.5 The Purpose of Doxography in *De Anima* 1.2

A first reason for thinking that Aristotle's treatment of earlier Greek thinkers will represent the fulfilment of step (3) of his scientific method of inquiry is that, when he comes to give an overview of their theories of soul in the 'doxographical' section of *DA* 1.2,⁷⁵ he does not merely report what these theories said it to be. Instead, he claims that earlier thinkers attempted to define (ὀρίζονται) the soul, and that they had reasons for thinking it to be one thing rather than another. In particular, he claims that they attempted to explanatorily 'reduce' (ἀνάγεται) each of the attributes by which they defined soul – motion, perception, or incorporeality – 'to properties belonging to the first principles' (πρὸς τὰς ἀρχάς) of their metaphysical theories.⁷⁶ Although these theories are said to differ with respect to the number of principles they affirmed,⁷⁷ and with respect to whether these principles were corporeal, incorporeal, or a combination of both,⁷⁸ Aristotle portrays earlier Greek psychologies as having the goal of explaining the essential cause of the soul's *per se* attributes by means of a definitional investigation into its principles.⁷⁹

For instance, Aristotle claims that Democritus defined the soul as a type of fire *because* (διὰ) fire atoms, *qua* spherical and highly mobile, are most of all able to slip into the bodies of animals and cause the atoms that comprise those bodies to move.⁸⁰ Similarly, in his discussion of the theories of those who held the soul to be responsible for perception and knowledge, he ascribes to Plato the deduction that, because 'like cognises like', and because the things we in fact know are composed of the first principles, the soul must also be composed of the first principles.⁸¹

Further, when he brings his review of his predecessors' psychologies to an end, he claims, in fulfilment of step (3), to have reported *both* what they handed down about the soul with respect to its motive and cognitive powers, and the *causes* in their definitions which purport to explain these *per se* attributes (καὶ δι' ὧς αἰτίας λέγουσιν οὕτω).⁸² Aristotle's reason for presenting the opinions of earlier thinkers in this fashion is that he thinks

⁷⁵ Cf. Mansfeld (1990, 3208–11).

⁷⁶ *DA* 1.2, 405b11–13.

⁷⁷ *DA* 1.2, 405a2.

⁷⁸ *DA* 1.2, 404b30–405a2.

⁷⁹ See Hankinson (1998, 50).

⁸⁰ *DA* 1.2, 404a5–9.

⁸¹ *DA* 1.2, 404b16–18.

⁸² *DA* 1.2, 405b30.

of their first principles as middle-term causes that can function in putative demonstrations of the soul's *per se* attributes.

1.6 The Use of the Demonstrative Heuristic in *De Anima*

It is apparent then that Aristotle represents earlier Greek psychologists as having provided definitions of soul meant to be explanatory of its attributes. It is also apparent that he explicitly tests these definitions with a view to the demonstrative heuristic he establishes in *DA* 1.1 in fulfilment of step (4) of his method of scientific inquiry.⁸³

A paradigm case of Aristotle's appeal to the demonstrative heuristic is found in his criticism of the harmony theory of soul.⁸⁴ In this context, he gives the argument:

[That the soul cannot be a harmony] would be patently obvious if someone attempted to explain (ἀποδιδόναι) the passive attributes and the active works (τὰ πάθη καὶ τὰ ἔργα) of the soul in virtue of a particular harmony; for it is difficult to harmonise them together (ἐφαρμόζειν). (*DA* 1.4, 408a3–5)

Aristotle is not simply making puns. His use of ἐφαρμόζειν carries the technical sense of having a theory 'fit with' the particular facts, as he explains in the *Posterior Analytics*:

Of those things whose genus is different, such as the things falling under arithmetic and the things falling under geometry, an arithmetical demonstration will not fit with (ἐφαρμόσσει) the *per se* attributes (συμβεβηκότα) of magnitudes, unless magnitudes are numbers. (*APo* 1.7, 75b3–6)

To say in this technical sense that things do not ἐφαρμόζειν is to say that one cannot explain the *per se* attributes of an item falling under a genus *K* by using principles from a genus *L*, unless *K* is subordinate to *L*.⁸⁵ This was Aristotle's original worry expressed in part (B) of the methodological challenge.

It is with this sense in mind that Aristotle claims that the principle of 'harmony' does not appear to explain – through a relevant middle term – any of the soul's *per se* attributes or capacities.⁸⁶ The reason why is that,

⁸³ Cf. Charles (2005, 167–70).

⁸⁴ See Gottschalk (1971); Charlton (1985); Caston (1997).

⁸⁵ See Peramatzis (2011, 69, n. 18).

⁸⁶ See also *Metaph.* A.5, 986a1–6.

using the demonstrative heuristic, if one posits that the essence of soul is a type of harmony, the most one can cull from this definition is a demonstrative syllogism of the following sort:

1. [A] P belongs_{per se} to [B] harmony of bodily opposites.
2. [B] Harmony of bodily opposites belongs_{def} to [C] soul.
3. [A] P belongs_{per se} to [C] soul.

The explanatory problem with this syllogism is that there are no known attributes of the middle-term, ‘harmony of bodily opposites’, which provide an explanatory link to any demonstrable attribute, P, that belongs to the soul, such as ‘able to cause perception’ and ‘able to cause cognition’.

For Aristotle, the bodily state of harmony is only explanatory of, for example, various musical qualities (e.g. the Lydian mode), or the state of various material combinations or mixtures (e.g. the state of houses, chairs, cakes, etc.). It does not, however, possess an explanatory connection to any particular *psychological* attribute. This implies that a harmony, under any determinate description, belongs to a genus different from soul, and that the science of soul is not subordinate to harmonic science.⁸⁷ I shall discuss many other examples and ways Aristotle appeals to the demonstrative heuristic in criticising his predecessors in the chapters that follow.

1.7 A Question about the Property of Incorporeality

Having established that Aristotle does make use of the demonstrative heuristic in criticising earlier definitions of soul, there remain two questions about its use: first, whether soul’s *per se* attributes collected in step (2), namely, its power to produce motion and perception, is complete; and second, whether Aristotle’s scientific method of inquiry is compatible with his so-called aporetic method.

The first question arises because, in *DA* 1.2, Aristotle seems to make a third addition to the list of attributes known to belong to the soul. He writes:

Nearly all the predecessors attempted to define (ὀρίζονται) the soul by these three things: motion, perception, incorporeality (ἄσωματόν). (*DA* 1.2, 405b11–12)

However, a close analysis of the role that this concept plays in *DA* 1 shows that incorporeality is *not* treated by Aristotle as a basic *per se* attribute

⁸⁷ See Chapter 6.

of soul.⁸⁸ Instead, it is cast as a feature that helps to explain the soul's ability to be productive of motion.⁸⁹ The explanatory connection of incorporeality to motivity receives official confirmation at the beginning of *DA* 1.4, where Aristotle writes:

Of the three ways handed down to us with respect to which they define soul, (A) some defined (ἀπεφάναντο) it as that which is most productive of motion in virtue of moving itself; (B) others as the most fine-grained or most incorporeal (τὸ λεπτομερέστατον ἢ τὸ ἀσώματώτατον) body among the other bodies. These views seem to contain certain puzzles (ἀπορίας) and inconsistencies (ὑπεναντιώσεις) – we have roughly discussed them. But it remains to investigate (C) what is meant by the claim that the soul is from the elements. (*DA* 1.5, 409b19–24)

Here, Aristotle refers to three groups of earlier Greek thinkers who defined the soul, marked out as (A), (B), and (C). It is true that Aristotle thinks there is a difference between groups (A) and (B). Those in (A) we might call strict incorporealists about the soul, while those in (B) we might call relaxed incorporealists. However, it is clear that Aristotle links (A) and (B) together insofar as both contain thinkers who defined the soul in virtue of its known *per se* attribute of *producing motion*. Plato and Xenocrates are included in (A), because they define the soul as a non-corporeal self-mover. Democritus, Diogenes of Apollonia, and Heraclitus, among others, are included in (B), because their theories identify soul as a corporeal mover that is *less* perceptible, or *less* stable, than typical corporeal things. In no case is incorporeality seen as a *per se* attribute of soul that has explanatory importance *apart from motivity*.⁹⁰

⁸⁸ In most contexts, Aristotle uses a comparative or superlative form of ἀσώματος, such as, 'most of all incorporeal' (μάλιστα ἀσώματων), which he makes logically equivalent to, 'finest in grain' (λεπτομερέστατον). Cf. Renehan (1980, 135, n. 68), who points out that Aristotle's superlatives can be taken as evidence against Gomperz's (1932) view that ἀσώματος in its earliest (and untested) use has the sense of 'fineness in grain'. Cf. Bartoš (2006).

⁸⁹ The explanation of its appearance in this list by Simplic. (*In de Anima*, 32.29–33.4), that incorporeality can be inferred from what was said about the soul beforehand, is vacuous, as is that of Themist. (*Paraphrasis in de Anima*, 14.4–23), the latter of whom claims that earlier thinkers seem to have been led unintentionally to 'dream up' this feature of the soul. Philop. (*In de anima*, 90.20–4) rightly sees incorporeality as a feature from which causing motion and being in motion follow.

⁹⁰ We find further assurance of the connection of incorporeality (and fineness in grain) to motivity in Aristotle's characterisation of Diogenes of Apollonia. Aristotle writes that he reasoned that soul is air because, 'insofar as air is finest in grain, it is productive of motion' (ἢ δὲ λεπτότατον, κινήτικόν). *DA* 1.2, 405a21–5. Aristotle also connects motivity to incorporeality in his discussion of Heraclitus. See *DA* 1.2, 405a25–8. See also *DA* 1.2, 404b30–405a7.

1.8 The Demonstrative Heuristic and Aporetic Tests

The second question about the demonstrative heuristic, whether it is compatible with Aristotle's aporetic method, requires a similarly nuanced answer. In claiming that he advocates using the demonstrative heuristic to test the explanatory adequacy of earlier definitions of soul, I do not mean to suggest that he does not also use other methodological tools alongside, or as part of, this heuristic, such as aporetic reasoning or dialectical *topoi*.

It is well established that one of Aristotle's most important means for testing out philosophical views involves working through puzzles or conceptual impasses (*ἀπορίαι*). These impasses result when a given philosophical claim and its denial can be taken to provide an explanation that is *prima facie* consistent with some *explananda*, whilst at the same time, *prima facie* inconsistent with other phenomena or established truths.⁹¹ Aristotle often casts earlier views as occupying, respectively, each side of a puzzle, in order to show that both sides rests upon a common false assumption.

It is clear that working through such puzzles is compatible with the use of the demonstrative heuristic, and in fact, can be seen as falling under its imaginative component. Thus, Aristotle finds *ἀπορίαι* for elemental soul theories,⁹² for the harmony theory of soul,⁹³ and for a panpsychist theory of soul.⁹⁴ However, solving conceptual puzzles that result from investigating the consequences of a particular thesis and its denial do not *constitute* Aristotle's preferred philosophical method for inquiring into the explanatory adequacy of earlier definitions of soul. Instead, raising puzzles for their theories is a part of Aristotle's method of scientific inquiry, whose essential part is the demonstrative heuristic.⁹⁵

In the following chapters, I shall attempt to show that Aristotle's treatment of earlier Greek psychologies is in general fair, philosophically rigorous, and oriented towards testing out their explanatory power. However, this thesis comes with three caveats.

First, it does not mean that, in a scientific inquiry, Aristotle cannot make use of the tools of dialectic.⁹⁶ In fact, just as his inquiry makes use of

⁹¹ For instance, one can have a definition of *F* that seems to explain its *per se* attributes, *B*, *C*, and *D*, but which entails the denial of *Q*, which is a fact of some science, *S*.

⁹² *DA* 1.5, 410a27.

⁹³ *DA* 1.4, 408a24.

⁹⁴ *DA* 1.5, 411a9.

⁹⁵ Pace Witt (1992, 171).

⁹⁶ See Kakkuri-Knuuttila (2005).

aporetic tests, in some cases, he also uses dialectical *topoi*. In some cases, the use of such *topoi* is necessary.⁹⁷ For instance, one cannot formulate a scientific definition that uses homonymous terms,⁹⁸ or that confuses effects with causes,⁹⁹ or that contains metaphorical classifications rather than literal ones.¹⁰⁰

However, as I argued above, the *use* of a dialectical tool or argument during the course of an inquiry is not sufficient for an inquiry *to be* 'dialectical'. Affirming the latter idea has tended to promote unnecessary confusion in the literature, as it implies that we should expect to find Aristotle always attempting to follow the rules codified in the *Topics* for criticising earlier thinkers, or using philosophically substandard arguments that are semantic in nature. What we actually find is that, in nearly all of Aristotle's criticisms, he gives rigorous philosophical arguments and ignores these rules.¹⁰¹ However, since this is a hotly debated topic, in what follows, I take pains to point out when and how I think that Aristotle makes use of dialectical tools in his criticisms.

Second, to say that Aristotle follows a scientific method of inquiry in *DA I* is *not* to say that *every* criticism he makes is one which attempts to syllogise, in an explanatory way, from a predecessor definition of soul, through one of its terms, to one of the soul's *per se* attributes. Although finding such explanatory connections *is* Aristotle's over-arching goal in reviewing earlier Greek psychologies, it is not a requirement of the method of scientific inquiry in general that one can *only* use syllogistic arguments in order to test the adequacy of particular definitions, as we saw already in the case of Aristotle's revised definition of thunder in the *Meteorology*.

As will be obvious in what follows, Aristotle thinks that there are a number of problematic consequences that follow from earlier definitions of soul which can be discovered simply by imagining what would follow if they were true. Some of these results of imagination show that some definitions of soul imply things that conflict with empirical phenomena; others show that they are in conflict with the principles of Aristotle's natural philosophy. For Aristotle, either of these kinds of conflict are enough

⁹⁷ Cf. Upton (1985).

⁹⁸ See *Top.* 1.15.

⁹⁹ See *Top.* 6.6, 145b10ff.

¹⁰⁰ See *Top.* 6.2, 139b32ff.

¹⁰¹ Cf. Owen (1961); Smith (1993); Kakkuri-Knuuttila (2005).

to show that a particular thesis or definition cannot provide an adequate explanation of the soul's *per se* attributes. In what follows, I shall describe these sorts of arguments as ones that appeal to the *imaginative component* of the demonstrative heuristic.

Finally, while the claims that take up the majority of Aristotle's time are those elements of his predecessors' system of nature that figure in their definitions of soul (e.g. atoms, harmony, self-moving motion, and self-moving number), he is also interested in the *law-like* principles they relied upon in order to justify their definitions. One of these is Empedocles' principle that, 'like cognises like'; another is the atomist and Platonic principle that, 'nothing moves anything else without being in motion'. In following a scientific method of inquiry, Aristotle will be concerned with testing out both sorts of principles.

1.9 The Necessity of the Demonstrative Heuristic

A final reason that Aristotle's inquiry into earlier theories of soul is necessary is this: in the *Posterior Analytics*, he makes it clear that to obtain scientific knowledge of the principles of some object of inquiry, one needs to show that possible alternative explanatory principles are not convincing:

If we are to obtain scientific knowledge through demonstration (δι' ἀποδείξεως), not only must we know the principles (ἀρχάς) better and be better persuaded of them than of what is being proved, but we must also not find any other claim more convincing or better known amongst claims opposed to our principles, from which a mistaken conclusion of some proposition contrary to our principles may be deduced, since someone who has unconditional scientific knowledge must necessarily be incapable of being persuaded of what is contrary to that knowledge. (*APo* 1.2, 72a37–b4)

If so, then Aristotle thinks that his *Hylomorphic Thesis* reached by the method of division in *DA* 2.1, as well as the further refinements of the definition of soul it offers, are plausible only because, *after* his inquiry into earlier definitions of soul, the *Hylomorphic Thesis* looks like it could provide a more plausible framework for explaining the soul's *per se* attributes than any Presocratic or Academic theory could.

We have then good textual evidence that Aristotle both wants to, and does, apply the demonstrative heuristic to earlier psychological accounts. If so, his treatment of early Greek psychological theories cannot simply

be identified as an exercise in historical doxography or dialectic or eristic (even if it contains elements of these activities), as many commentators still assume. Rather, Aristotle's criticisms of earlier Greek psychology form a crucial part of his, and his school's, considered attempt to see how the principles of material, formal, final, and efficient cause, identified as first principles in his works on natural philosophy, apply to the case of soul and body.

Definition, Explanation and the Soul–Body Relation

There are two further questions which they add at the end: how can the soul move the body if it is in no way material, and how can it receive the forms of corporeal objects... These questions presuppose amongst other things an explanation of the union between soul and body, which I have not yet deal with at all. But I will say, for your benefit at least, that the whole problem contained in such questions arises simply from a supposition that is false, and cannot in any way be proved, namely, that, if the soul and the body are two substances whose nature is different, this prevents them from being able to act on each other.

Descartes, *Appendix to the Fifth Set of Objections and Replies*

2.1 Introduction

In *DA* 1.3, Aristotle adds a further condition for an adequate scientific definition of soul: along with explaining the soul's *per se* attributes, it must also explain the nature of the soul–body relation. This condition is in a way already implied by the demonstrative heuristic, since it presupposes that the *per se* attributes that belong to the soul are those that it manifests in a living body.

Just as importantly, Aristotle presupposes that to meet this condition, an explanation of the soul–body relation should be consistent with the best laws of (Aristotelian) physics. In particular, Aristotle will argue that it must conform to a general principle, which I call the *Axiom of Causal Association*, which explains why natural things are able to interact with one another. He writes:

But this is the absurdity involved in this [*sc.* Timaeon account] as well as most (πλείστοις) other accounts concerning soul: they attach (συνάπτουσι) the soul to, and place it (τιθέασιν) within, body, having not added to their

definition (προσδιορίζοντες)¹ [of soul] the cause by which (διὰ τίν' αἰτίαν) this occurs, nor in what state the body is in. And yet some such explanation would seem to be necessary; for it is on account of an association (κοινωνίαν) that one thing acts (ποιεῖ), and another thing suffers (πάσχει), that one thing is moved (κινεῖται), and another thing causes motion (κινεῖ); and of these relations, none belong (ὑπάρχει) to things related by chance. (DA I.3, 407b13–19)

Here Aristotle proposes that, apart from the ability to provide motion and perception to living things – a good definition of soul must also be able to account for: (1) the presence of soul in bodies, (2) the kinds of bodies it can be present in, and (3) the natural principle (s) in virtue of which souls are able to affect (or be affected by) such bodies. This new definitional requirement leaves no room for doubt that Aristotle's concern with earlier Greek psychology is scientific in nature.

I first explore Aristotle's claim that earlier thinkers did not provide descriptions within their definitions of soul that facilitate a principled explanation of how soul and body are causally related to one another (Section 2.2). I then discuss his suggestion that the soul–body relation can be explained in virtue of a principle that I call the *Axiom of Causal Association* (Section 2.3). I go on to illustrate the categorial nature of this principle, and its philosophical importance in constructing a theory of the soul's causal relationship to the body. I argue that a proper understanding of Aristotle's reason for insisting on this principle in psychology allows us to see why the problem of soul–body interaction arises for Cartesian dualism, but not for hylomorphism (Section 2.4). I then discuss Aristotle's famous criticism of transmigration theories *via* his craft–soul analogy, and whether or not Plato really falls prey to such a criticism (Sections 2.5–2.7).

2.2 Causal Community in the Definitions of Related Entities

Aristotle alleges that most earlier definitions of soul did not include – in the *definiens* – a property from which they could demonstrate why soul is in, or why it can move, the body. In order to avoid this problem, and turn a dialectical or empty definition of soul into a scientific one, he says, one needs to build into the definition of soul an ability for it to be in and

¹ The term προσδιορίζειν one that Aristotle uses to refer to the process of adding in terms or phrases to a definition or account in order to make it complete. Cf. *Metaph.* Γ3, 1005b21, *Metaph.* Γ3, 1005b27; *Metaph.* Θ5, 1048a17; *NE* 6.3, 1139b32; *DA* 2.2, 414a23; *DI* 5, 17a36; *DI* 9, 20b29.

cause motion to a specific sort of natural body. Similarly, he suggests, one needs to ‘build into’ the definition of a natural body an ability to possess soul and undergo the motions it produces. Aristotle is thus asking for a principle that would underwrite a syllogism of the following sort:

1. [A] Soul belongs_{def} to [B] a kind *K* causally related to bodies in a certain state.
2. [B] Kind *K* belongs_{per se} to [C] bodies in a certain state.
3. [A] Soul belongs_{per se} to [C] bodies in a certain state.

Aristotle argues that this further requirement for a good definition of soul follows from a basic principle established in his natural philosophy: in order for any *x* and *y* to associate causally with one another by nature, there must exist an associative relationship between *x* and *y*, namely: *x* has a capacity to affect *y* iff *y* has a capacity to be affected by *x*.²

Aristotle advocates this principle in a number of places, but its clearest explication is found in *GC* 1.7. In this chapter, he gives a brief history of the general principles earlier thinkers proposed for explaining the possibility of natural objects affecting or moving one another. The candidate principles of interaction he reduces to two: (I) the principle that an object can only be changed by an object *unlike* it, and (II) the principle that an object can only be changed by an object *like* it.

Aristotle claims that most earlier Greek thinkers held the former principle, and that Democritus was the sole defender of the latter.³ Call the first the *Causal Difference Principle*, and the second the *Causal Likeness Principle*. Since these principles are contrary to one another, Aristotle sets himself the task of figuring out which one makes more sense to affirm as a principle of natural interaction.

In favour of the *Causal Difference Principle*, Aristotle argues that if any two things were absolutely like one another, there would not be a sufficient reason that would explain why one would act on the other rather than *vice versa*, or indeed why one would act upon the other at all. However,

² Cf. *Phys.* 3.1, 200b28–32; *Metaph.* Θ.1, 1046a19–26; Hicks (1907, 262).

³ Heidel (1906, 357–8) claims this to be ‘demonstrably’ false, citing Democritus (Aristotle’s own example) and Diogenes of Apollonia (DK64 B2 = TEGP 4[F2]) as counter-examples. However, the Diogenes fragment is *not* ‘an emphatic enunciation of the principle that like is changed by like’. It is rather a proto-Aristotelian claim that materials like, ‘earth, water, air, and fire’, which obviously *are* different from one another at the level of perception, must nevertheless not be different ‘in their own nature’ (τῇ ἰδίᾳ φύσει) if they are to interact, which Aristotle accepts. Cf. *GC* 1.7, 322b11–19.

in favour of the *Causal Likeness Principle*, he argues that if two things are completely unrelated, such as a line and whiteness, then there seems to be no way one could change the other. The point here is a categorical one. Just as one cannot think of colour *qua* colour causing a particular smell, Aristotle claims that we cannot conceive of whiteness, with respect to its being white, 'acting upon' a line, with respect to its being a line (e.g. bending it), or *vice versa*.⁴

2.3 The Axiom of Causal Association in Psychology

Instead of choosing between one or the other of these causal principles, Aristotle proposes a new principle that is an elegant synthesis of both. He argues that, for any two things to interact by nature, they must both be opposite to one another (and hence 'unlike') in one respect,⁵ and not be opposite to one another (and hence, 'like') in another respect. When two things meet both these conditions, Aristotle calls them natural agents and patients. He defends this claim as follows:

But since it is not by chance that any two things are by nature such as to act and be acted upon by one another (τὸ τυχὸν πέφυκε πάσχειν καὶ ποιεῖν) – but only those that are opposites or are in a state of contrariety – necessarily agent and patient must be alike in genus and the same, and yet unlike and opposite in species. For by nature body is acted upon by body, flavour by flavour, colour by colour, and so generally that which is homogenous is acted upon by that which is homogenous (τὸ ὁμογενὲς ὑπὸ τοῦ ὁμογενοῦς). The cause of this is that opposites are in every case within a single genus, and opposites are what reciprocally act and are acted upon). Hence, agent and patient must be in one sense the same [as one another], but in another sense different and unlike. (*GC* 1.7, 323b29–324a5)

This passage provides a summary of Aristotle's rationalist attempt to explain why objects in nature interact with one another in a law-like and intelligible way and not by chance.⁶ This abstract principle, he thinks, not only explains lower-level phenomena, such as why water can quench fire and fire can evaporate water, but also, higher-level phenomena, such as

⁴ Aristotle would not, presumably, count 'making the line white' as whiteness changing the line. Instead, he would say that 'Whiteness making the line white' should be analysed as 'Whiteness making the *blackness* in the line white'.

⁵ *GC* 1.7, 323b27–8.

⁶ Burnyeat (2002, 39) calls this 'a fundamental explanatory principle of Aristotelian physics'. Even so, the principle quickly runs into difficulties with respect to explaining particular chemical changes. See Mourelatos (1984).

why males of one animal genus cannot impregnate females of a different one. I shall call this Aristotle's *Axiom of Causal Association*.

Axiom of Causal Association =_{def} For all x and y , x can be affected by y by nature iff (1) x and y fall under a common genus, U , which contains opposite species F and G , and (2) x has F and y has G .

By this principle, black and white can be opposite to one another since they exist in the genus of colour, but black and white cannot be opposite to two and three, since these numbers exist in the genus of discrete quantity.

What is remarkable is that, in our *De Anima* passage, Aristotle suggests that the *Axiom of Causal Association* also applies to the domain of psychology. Indeed, he claims that it is a requirement of psychology to show how soul and body fit under it, given that the principle is put forward as holding for *all* naturally interacting entities. Aristotle's criticism is not simply that earlier psychologists failed to observe how close the relationship is between the soul and the body it inhabits. Rather, it is that they did not specify the soul–body relation in the way the *Axiom of Causal Association* requires.

Even so, it is not by any means easy to see how this principle *could* apply to psychology. For one thing, Aristotle's standard application of this principle usually involves two independent *bodies*, each of which is able to mutually change the other by destroying the other body's opposite quality such that a new basic element comes to be, or by both bodies equalising, or forming a synthesis of their qualities, such that a chemical mixture is formed.⁷ Even so, Aristotle assumes that this principle does and must apply, if it is right to think that one of the soul's *per se* attributes is to be able to cause the body to move.

2.4 Associative Entity Dualism and Cartesian Dualism

Aristotle's concern with explaining the soul–body relationship is connected in a striking way to the Cartesian mind–body problem, which is how can a *non-extended* substantial mind interact with an *extended* substantial body.⁸ Aristotle's *Axiom of Causal Association* suggests why this picture is intractable. It asserts that, regardless of what sort of thing

⁷ See Chapter 6, Section 6.4.

⁸ The modern presupposition being, of course, that in order to affect one another any two things must (a) be in spatial contact with one another, and (b) possess some sort of solidity.

(ποῖόν) a given x is, if it interacts with some y by nature, there will be a causal association principle, connected to the essences that figure in the definitions of both x and y , that helps to explain why this is so. Call this position *associative entity dualism*.

Prima facie, Cartesian dualism might seem to meet requirement (2) of Aristotle's *Axiom of Causal Association*, as soul and body bear the opposite predicates, 'non-extended' and 'extended'. However, it clearly does not meet requirement (1), since soul and body in Cartesianism do not fall under a common genus. In fact, Cartesian dualism posits that soul and body fall under *contradictory* genera, because it is committed to the view that reality can be divided into two 'genera' of substances, immaterial and material substance, such that what it means to be such a substance is to be extended or non-extended.

Aristotle would diagnose the problem of substantial interaction in Cartesian dualism as amounting to the problem that there is no higher-level *natural* genus above extended and non-extended things that can explain their causal relation to one another. To avoid this problem, Aristotle would have urged Descartes to specify a common genus for extended body and non-extended soul, and the *F* and *G* properties or relations in virtue of which their interaction is intelligible. However, to do this, Descartes would have had to adopt a different categorial theory of being, in which extended things and non-extended things did not figure as ultimate disparate genera.

2.5 The Craft–Soul Criticism

Aristotle also offers an analogy to show why a science of soul needs such a principle. Although he might have given a concrete example from nature to show that not any two chance things can interact, such as the fact that a magnet can move some types of body (e.g. iron filings), but not others (e.g. milk),⁹ instead, he gives a positive example that appeals to artifice to show the way soul *should* be understood to interact with the body. He writes:

These accounts merely attempt to say what sort of thing (ποῖόν τι) the soul is, but they add nothing at all to their definition (προσδιορίζουσιν) concerning the body that is to receive (δεξιόμενου) it: just as if it were possible, as the Pythagorean stories claim, for any soul to be clothed in

⁹ Cf. *DA* 1.2, 405a19–21.

(ἐνδύεσθαι) any chance body. For it appears that each body possesses a particular (ἴδιον) form and shape (εἶδος καὶ μορφήν), but what they claim is like someone saying that the craft of carpentry (τεκτονικήν) could be clothed in (ἐνδύεσθαι) flutes: for it is necessary that an craft (τέχνην) must use (χρησθαι) [the right] tools (ὀργάνους), and that the soul [must use the right] body. (DA 1.3, 407b20–6)

Aristotle's own preliminary elucidation of what he is after appeals to the analogy of a craft that cannot be exercised without the appropriate tools. His argument makes the best sense in cases in which a craft is 'in action', so to speak, i.e. when carpentry *is occurring*, or music is *being played*. When a craft is active in this way, it necessarily requires certain kinds of instruments. Aristotle's emphasis here is decidedly not on the idea that the activity 'supervenes' upon the tool, or that the tool 'gives rise' to the activity; it is rather the reverse: a tool is *used by* an intellectual activity to achieve the ends defined by the craft.

One way to read this analogy is to see Aristotle as saying that, if a body is not *by nature* suited to being used by the soul, then the soul will always have difficulties in trying to accomplish its peculiar goals, just as a builder would run into trouble using a flute as a hammer. This, Aristotle suggests, would seem likely to happen to a reincarnating soul which had a well-defined essence for accomplishing species-specific goals, such as a dog's soul having the goal of moving the dog's body to chase live prey on four legs, or a fly's soul having the goal of navigating the fly's body through the air in search of decayed food.¹⁰

Along with certain unnamed Pythagoreans, Aristotle almost certainly has Plato and other Academics in his sights here. Not only does Plato hold a version of the transmigration theory that is here used as a paradigm case of an account that does not properly explain why the soul exists in the body and can affect it, but the language Aristotle uses to describe the soul's 'entering in' or 'being clothed in' (ἐνδύεσθαι) any chance body evokes both the *Republic's* and in the *Phaedo's* reincarnation myths.¹¹

¹⁰ In line with this interpretation, Themist. (*Paraphrasis in de Anima*, 23.37–24.2) gives the amusing picture of the soul of a gnat coming to inhabit the body of an elephant, and suggests that it would be difficult for the soul of a gnat to control the life-activities of an elephant body (e.g. because it might try to make it fly). Cf. Tertul. *De Anima* 32.6.

¹¹ *Rep.* 10, 620c3; *Phaed.* 81e2–82a1. Cf. the mention of Pythagorean transmigration in Xenophanes DK21 B7 = TEGP 18[F9], and Empedocles DK31 B117 = TEGP 178[F124]. Neither of these fragments, however, contains the term ἐνδύεσθαι.

2.6 Plato on the State of the Body

In the next chapter, we will see what Aristotle's specific criticisms of Plato's definition of the soul are, and the extent to which the latter's definition conforms to the demonstrative heuristic. However, it is worth pausing to ask whether Aristotle is justified in taking Plato to have failed to meet the requirements of the *Axiom of Causal Association*. This is because, in all of Plato's dialogues in which he discusses the relation of soul and body, including the *Phaedo*, he *does* give some account of the body that is to receive soul, and he does so in terms of that body's form and shape.

In the *Phaedo*, for instance, Plato claims that one's predominant desires during a given incarnation will cause one to transmigrate into an animal that naturally feels and behaves in accordance with them. Those who have valued injustice and plunder, for instance, will enter into wolves and hawks, because they are governed by such desires.¹²

Moreover, in the *Timaeus*, Plato expands upon this story by positing appropriate geometrical shapes for these different predominant desires, which shapes determine the kinds of body the soul can be reincarnated in. For instance, by being rational, a soul will retain its circular shape, and thus reincarnate in a human body with a circular head. If a soul does not use its rational capacities well, its circular shape will become elliptic and flattened out, such that in its next reincarnation it will only fit into the elongated head of a bird or a reptile.¹³

Even if such stories strike us as fanciful, they *do* provide an account of the condition of the body that is to receive the soul. If so, then Plato's theory of soul seems immune to Aristotle's criticism.¹⁴ Further, since Aristotle has the *Timaeus* as one of his targets, and probably the *Phaedo* and *Republic* as well, we must conclude one of two things: either Aristotle has failed to recognise that Plato's account of soul does specify why the soul exists in the body, or there is some deeper feature about Plato's account of the soul-body relation that Aristotle still finds problematic.

There is a feature, in fact, that remains problematic about Plato's account of the soul-body relation. It is that, like most earlier Greek psychologies, it does not contain a description in the *definiens* of soul that facilitates an explanation of why it can act upon and use the body.¹⁵

¹² *Phaed.* 82a3–6.

¹³ *Tim.* 42c1–4; *Tim.* 91d6–92c3.

¹⁴ As Philop. (*In de anima*, 140.25–141.20) forcefully argues.

¹⁵ Cf. *DA* 1.3, 406b22–3.

As we shall see in Chapter 3, this is because Plato's definition of the soul as a 'self-mover' does not contain or imply any descriptions which refer to the body.

2.7 The Results of the Causal Association Problem

Aristotle thinks that most earlier Greek accounts of soul fall prey to the causal association problem because their definitions of soul and body do not contain descriptions that explain their natural relation to one another. For him, if a *definiens* of soul only mentions what *sort* of thing it is, but does not specify the kinds of body it naturally interacts with, nor the nature of those kinds that makes them subject to the soul's powers, it cannot be an adequate scientific explanation of the soul–body relation. The advantage of Aristotle's formulation of the *Axiom of Causal Association* is that it leaves open the nature of the higher-level genus and the opposite properties that explain this relation. It only claims that, *whatever* soul turns out to be, it will only be in the body, and only act upon the body, if soul and body both *do* fall under such a genus and *differ* somehow in form or species. Aristotle adds that this difference should be on display within the definitions of (living) body and soul.

As we shall see in the following chapters, Aristotle will attempt both to demonstrate the soul's *per se* attributes from earlier definitions of soul, and to test whether these earlier definitions explain the soul–body relation in accordance with the *Axiom of Causal Association*. In the conclusion of this work, we shall see how Aristotle's *Hylomorphic Thesis* attempts to conform to the positive stricture of associative entity dualism.

CHAPTER 3

Plato's Psychology

Nature is a certain principle and cause of being-moved and being-at-rest in that to which it belongs primarily, in virtue of itself and not accidentally.

Aristotle, *Physics* 2.1, 192b20–23

3.1 Introduction

The formation of Aristotle's hylomorphic conception of the soul undoubtedly begins with Plato (ca. 424–347 BCE), his philosophical teacher at the Academy in Athens from the age of 18–37. Plato's method of conceptual analysis, his pursuit of real definitions, and his claims that the nature of soul cannot be explained by the properties of material elements,¹ furnished Aristotle with many of the conceptual tools and arguments that helped him to develop his own view of the nature of soul and its relationship to the body.

Even so, Plato expresses a variety of claims about the soul throughout his dialogues without ever asserting any one view as dogma.² Amongst these claims are that soul has an antenatal and post-mortem existence,³ that it is unable to be corrupted by the body,⁴ and that it can be divided into rational, appetitive, and spirited parts.⁵

However, in the *De Anima*, Aristotle is concerned with Plato's definitions of soul advanced in the *Phaedrus* and *Laws*. In *Phaedr.* 245c7, Plato argues for the claim that soul 'what moves itself' (τὸ αὐτὸ κινουῦν), as well

¹ Cf. *Leg.* 10, 891c.

² Cf. Shorey (1960, 40–9).

³ Cf. *Meno* 81c; *Phaed.* 114d.

⁴ *Rep.* 10, 608cff.

⁵ *Rep.* 4, 435cff. See Chapter 10, Section 10.2.

as the thesis that, as the only thing that can move itself, it is the source and principle of motion for all moving things.⁶ If the soul can move itself, Plato argues, it can also serve as its own source of life and activity, and hence, can continue to exist after the dissolution of the body it happens to inhabit.

Plato reaffirms his commitment to this theory in *Leg.* 10 by explicitly defining the soul as a self-mover. In this work, in the voice of the Athenian Stranger, he argues that, since what is moved must be moved by something else in motion, in any series of motions, it is necessary to trace the series back to a ‘self-moved motion’ (τὸ ἑαυτὸ κινεῖν). This self-moved motion, he argues, ‘has the same definition and substance’ (λόγον ἔχειν τὴν αὐτὴν οὐσίαν) as the soul.⁷

In this chapter, I show how Aristotle reviews, and then tests, the explanatory adequacy of these claims about the soul’s essence, which he subsumes under the definitional formula: soul =_{def} that which moves itself (τὸ κινουὺν ἑαυτό).⁸ I first explain Aristotle’s criticisms of this definition, and show how these criticisms relate to his demonstrative heuristic (Sections 3.2–3.7). I then argue that the results of Aristotle’s criticisms place a negative constraint on him to deny that soul is *a* physical being – in the sense of a natural kind of object that possesses a φύσις or an ‘internal principle of motion and rest’. However, they also suggest a positive way forward: soul might be understood as itself a φύσις *in* certain physical beings (Sections 3.8 and 3.9).⁹

3.2 Aristotle’s Account of Plato’s Psychology

Aristotle introduces Plato’s definition of the soul from the *Laws*, and his reasons for holding it, in *DA* 1.2:

Those who claim that the soul is that which moves itself (τὸ αὐτὸ κινουὺν) also come to the same basic view [as the Pythaoreans]. For these seem to have supposed (ὑπειληφέναι) that motion (κίνησις) is what is nearest in nature to the soul (οἰκειότατον εἶναι τῇ ψυχῇ), and that all (πάντα) other things are moved (κινεῖσθαι) because of (διὰ) the soul, but that the soul is moved by itself (ὑφ’ ἑαυτῆς), because (διὰ) they never observed anything causing motion (κινουὺν) that was not also itself in motion (κινεῖται). (*DA* 1.2, 404a20–5)

⁶ *Phaedr.* 245c9.

⁷ *Leg.* 10, 896a3–4.

⁸ *DA* 1.3, 406a1.

⁹ See Johansen (2008).

Aristotle's report here offers a summary of the argument from *Leg.* 10; however, it is more than doxographical.¹⁰ Alongside reporting what the Platonists believed about the soul, he *also* includes an implicit reference to the causal principle that justified their definition of soul – namely, nothing causes motion that is not in motion – and he suggests that this principle is inductively inadequate. As we shall see, the reason why he includes this information is so that he can show where Plato's definition of soul fails the test of the demonstrative heuristic.

3.3 The Soul's Motion: Unnecessary or Impossible?

When Aristotle turns to criticise Plato's definition of soul, he does not reject it outright. Instead, he offers an elaborate and careful series of questions aimed at establishing in what sense, precisely, the principle of self-motion helps to explain how the soul moves the body. He writes:

Let us investigate first the topic of motion. For perhaps (ἴσως) it is not only false that the essence (οὐσίαν) of the soul is such as they claim that it is, namely, 'a thing moving itself' (τὸ κινουὺν ἑαυτὸ), or 'a thing with the potential to move itself' (δυνάμενον κινεῖν),¹¹ but also impossible that motion (κίνησιν) belongs to it.¹² On the one hand, that it is not necessary (οὐκ ἀναγκαῖον) for what causes motion (τὸ κινουὺν) to also be moved (κινεῖσθαι) we affirmed earlier.¹³ But, there are two senses in which anything is in motion (κινουμένου): either it is moved with respect to something different (καθ' ἕτερον), or it is moved with respect to itself (καθ' αὐτό); we say that something is moved with respect to something different insofar as it is moved by being in something moving (ἐν κινουμένῳ), such as sailors are moved [by being in a ship]; for the sailors are not moved in the same way as the ship; for the ship is moved with respect to itself (καθ' αὐτὸ κινεῖται), but the sailors with respect to being in the moving ship (ἐν κινουμένῳ εἶναι). This is clear in the case of the parts of the body. For the proper (οἰκεία) motion of feet is walking (βάδισις), and walking belongs to

¹⁰ Cf. Viano (1996b, 58).

¹¹ This qualification provides further evidence that Aristotle has in mind the *Laus*, since it is the only dialogue that contains a definition of soul that references a capacity for self-motion (τὴν δυνάμενὴν αὐτὴν αὐτὴν κινεῖν κίνησιν) (*Leg.* 10, 896a3). See Cherniss (1944, 391, n. 311).

¹² Strictly speaking, Aristotle should have added '*per se*' here, because it is clear from *DA* 1.4, 407b30–1, that Aristotle does not think it impossible for motion to belong to the soul *per accidens*.

¹³ Ross (1961, 186) supposes πρότερον εἰρηται to be a reference to *DA* 1.2, 403b29, but Themist. (*Paraphrasis in de Anima*, 15.14–17) and Simplic. (*In de Anima*, 34.21–3) think that Aristotle is referring to *Phys.* 8.5. Hicks (1907, 240) remains agnostic. I take it that the commentators are correct.

humans, but walking does not belong to sailors at the time (τότε) they are sailing. But since being moved is said in two ways, we must now investigate (ἐπισκοποῦμεν) whether soul is moved (κινεῖται) with respect to itself (καθ' αὐτήν) and shares (μετέχει) in motion. (*DA* 1.3, 405b31–406a12)

That Aristotle is conducting a scientific inquiry into the adequacy of the Platonic definition of soul on offer, rather than trying to give a dialectical refutation of it, can first be seen by noting there are a number of semantic attacking points (τόποι) available from the *Topics* that Aristotle *might* have used if his criticisms here were merely dialectical.¹⁴ As one example, he could have used the attacking point of whether a definition fails to give a proper genus, discussed at *Top.* 6.5. This error occurs, says Aristotle, when one gives a participial phrase as a definition (e.g. 'the thing φ-ing'), rather than a descriptive genus plus a defining attribute (e.g. 'The *F* that φs/is φ'). As examples of the former and flawed sort of definition, Aristotle gives: 'body' =_{def} 'that which has three dimensions' (τὸ ἔχον τρεῖς διαστάσεις), and 'man' =_{def} 'that which knows how to count' (τὸ ἐπιστάμενον ἀριθμεῖν).¹⁵

Here, similarly, Plato is said to have defined soul as either 'something moving itself' (τὸ κινοῦν ἑαυτό), or, 'something capable of moving itself' ([τὸ] δυνάμενον κινεῖν [ἑαυτό]) – definitions which both lack a proper genus.¹⁶ From here, Plato might have answered this hypothetical criticism by stating his view in the *Laws* that 'motion' is the proper genus of soul, and Aristotle in turn might have then denied that motion is a proper genus.¹⁷ However, nothing like this sort of exchange happens here. Instead, Aristotle approaches Plato's definition in a more considerate manner, as if recognising that the territory is difficult to navigate.

To justify his opening doubts about motion belonging to the essence of soul, Aristotle begins by making two claims that appear scientific. The first is: (1) it is perhaps not *necessary* that motion belong to the essence of soul. The second is: (2) it is perhaps *impossible* for the soul to be in motion at all.¹⁸

We can understand Aristotle's claim in (1) better once we remember that the type of definition of soul that he is after is one that exhibits its

¹⁴ As Ross (1961, 17) alleges.

¹⁵ *Top.* 6.5, 142b25–6.

¹⁶ *DA* 1.3, 406a1–2.

¹⁷ Cf. *Phys.* 3.2, 201b26–7.

¹⁸ See Menn (2002, 96–7).

essence or essential properties. Since essential properties are by definition *necessary* properties – properties that an *F* must have if it is to be an *F* rather than a *G* – if there are reasons for thinking that self-motion might turn out to be a non-necessary property of soul, then this property cannot belong to its essential definition. Claim (2) is stronger; it suggests that soul might belong to a category of objects of which it is not even intelligible to predicate motion (e.g. abstract numbers).

In the passage above, Aristotle only means to show the plausibility of thesis (1). To this end, he begins by assuming the truth of a causal principle put forward in *Physics* 8.5, that it is not necessary for everything that moves something else to itself be in motion, because there is such a thing as an unmoved mover. If so, Aristotle suggests, then if unmoved movers form a natural kind, it is *possible* that souls also belong to this kind. To justify (2), he proceeds to investigate the different ways in which the Platonic definition of soul can be understood.

This he accomplishes through an analysis of the different ways in which 'being moved' (κινουμένον) might be meant.¹⁹ He argues that the claim that the soul is 'moved' is ambiguous,²⁰ since being in motion (κινουμένον) can bear the meaning either of being moved *per se* (καθ' αὐτό), or of being moved *per aliud* (καθ' ἕτερον). In the former case, the idea is that some spatial object *x* can be in motion independently of another spatial object *y*.²¹ In the latter case, the opposite holds; *x*'s being in motion necessarily derives from some spatial object *y* being in motion, of which *x* is an intrinsic spatial part or attribute.²²

Importantly, neither the soul's being in motion *per se*, nor its being in motion *per aliud*, rules out its ability to cause motion in other objects *per se*.²³ Rather, Aristotle's distinction between how sailors in a ship are moved and how the ship is moved only shows two *different ways* in which

¹⁹ This exploration of the 'many ways *x* is meant/said' (πολλὰ ἄλλως λέγεται) is a fundamental insight of Aristotle's logical theory, and is used in his logical, ethical, physical, and metaphysical works. Cf. Shields (2002); Ward (2008).

²⁰ Cf. *Phys.* 8.5, 257b18–19. In *GC* 1.7, 324a26–9, Aristotle argues that τὸ κινεῖν is also said διχῶς.

²¹ Despite some grammatical differences, this distinction seems likely to have been uncontroversial to Platonists, given that some form of the *per se/per accidens* distinction was in active use in the Academy, e.g. *Soph.* 255c14–15. See Annas (1974).

²² Cf. *Phys.* 2.1, 192b23–7; *Phys.* 4.4, 211a17–22; *Phys.* 5.1, 224a21–30; *Phys.* 8.4 254b7–12. I take it that this implies that, if one is riding a bike, one is moved locally *per aliud* (or *per accidens*), in virtue of the bike's local motion, despite the fact that one is causing the motion of the bike (through pedaling) *per se*. See Carter (2018).

²³ As I shall argue below, Aristotle accepts the latter claim.

the soul might be conceived of as being in motion.²⁴ Call the first of these ways *Contained Accidental Motion*:

Contained Accidental Motion =_{def} Some x is in contained accidental motion iff x (i) is not an intrinsic spatial part of y , and (ii) exists in a y which is undergoing a motion M *per se*.

This principle is instantiated in Aristotle's sailor/ship argument. He claims that whilst ships have a natural motion that they undergo *per se*, the motion that belongs to sailors whilst on a floating ship is merely contained accidental motion, not a form of motion that could be properly explanatory of the motion that belongs to them *qua* sailors.

That Aristotle does not mean to rule out the idea that soul could have a different *per se* motion from the body in which it resides is suggested by the argument that immediately follows. It assumes that a subject of motion might be said to be moved accidentally if it is contained in something else *and* moved in a way different from its natural *per se* motion. Call this *Restrained Accidental Motion*:

Restrained Accidental Motion =_{def} Some x is in restrained accidental motion iff x (i) is not an intrinsic spatial part of y , (ii) exists in y which is undergoing a motion M *per se*, and (iii) has its own proper *per se* motion P .²⁵

Restrained accidental motion, as is apparent, is just a more specific form of contained accidental motion. However, the difference between these two forms of accidental motion is important. The latter, but not the former, provides justification for the idea that, even *if* the soul undergoes some motions *per aliud* by being in a moving object (e.g. the soul of a dog running towards a bone), it need not undergo *all* of its motions by being so contained: restrained accidental motion leaves open the possibility that a soul might both initiate and suffer its own proper motion. This latter point becomes clear in the argument about the motion that sailors can partake of *qua* human beings. In it, Aristotle gives a different reason for rejecting the idea that sailors are moved *per se* whilst in a sailing ship, namely, that the kind of motion that belongs to sailors *per se* is the sort of motion that belongs to them not *qua* sailors, but *qua* human – walking.

²⁴ See *Phys.* 4.4, 211a17–22.

²⁵ I take it that it does not matter whether P is exercised or not. A plant, for example, to which belongs a *per se* motion of growing, will still suffer restrained accidental motion whilst on a moving ship whilst growing and whilst not growing. I thank Thomas Johansen for this clarification.

Plato's own complex thoughts on the ways in which the soul can move and be moved suggests that he would be amenable to the idea that the soul is subject to restrained accidental motion. For instance, he depicts the power of reasoning as a natural motion that the soul engages in 'itself through itself' (αὐτῇ δι' αὐτῆς),²⁶ and claims that there are some motions (e.g. perception) that the soul suffers only because of its enclosure within a body.²⁷

Regardless, Aristotle does not take himself to have proven anything about what kind of motion – if any – the soul can partake of. Instead, he takes it to be the task of his present investigation to determine the basic senses in which a Platonic soul might be in motion. These ways come to three: (i) *per se*, (ii) *per accidens/per aliud* (contained motion), or (iii) *per se* and *per accidens* (restrained motion).

3.4 Is Soul Moved *Per Se*?

Aristotle begins by investigating in which way the soul might be moved *per se*. He writes:

There are four ways of being in motion – spatial motion (φορᾶς), qualitative alteration (ἀλλοιωσέως), diminution (φθίσεως), and growth (αὐξήσεως) – and so soul will be moved with either one, many, or all of these kinds of motion. But if the soul is not moved *per accidens* (μὴ κατὰ συμβεβηκός), then motion would belong to it by nature; but if this is the case, so also would location (τόπος). For all of the aforementioned types of motion occur in a location (ἐν τόπῳ). But if the essence (οὐσία) of the soul is to move itself, then the property of 'being moved' (τὸ κινεῖσθαι) will not belong to the soul *per accidens*, just as in the case of white, or three-cubits; for these are moved, but moved *per accidens*, for it is that to which white and three-cubits belong, namely, the body, which is the thing really moved. For this reason, location does not belong to them [*per se*]. But location will belong to soul if it shares (μετέχει) in motion by nature (φύσει). (DA I.3, 406a12–22)

The first thing to note is that Aristotle is not giving a criticism of Plato's definition of soul, but rather going through a series of deductions about what its nature must be like if it is essentially a self-moving motion. He needs this richer conception of Plato's definition of soul in hand in order to see if it passes the test of the demonstrative heuristic.

Aristotle's claim that a naturally moving soul must engage in a particular form of motion has a dialectical precedent in *Top.* 2.4, 111b4–8.

²⁶ Cf. *Theaet.* 185e1; *Phaed.* 79c2–79d7.

²⁷ Cf. *Tim.* 44a7–b1.

There, Aristotle gives advice on how to challenge a generic predication, and gives as an example the claim that 'being moved' (a generic term) belongs to the soul. He claims that a generic term cannot truly be predicated of something unless one of the species falling under this generic term is truly predicated of it. As an example, he says that if one predicates 'being moved' of the soul, if no species of motion can be found for the soul to partake of, the soul cannot be moved.

Although this attacking point sheds some logical light on the above passage, we can see that Aristotle's deductions here are both more complicated and have a different intent. He does not just list a few species of motion, and then deny that the soul partakes of those species. Instead, he argues that if the soul is not moved *per accidens*, then it moves by nature, and if by nature, by one of the four forms of natural motion, and if by natural motion, then soul is located in a place. These are all claims about natural motion that Aristotle explains and defends in his *Physics*.²⁸

Even so, one might suspect that Aristotle is being unfair here, because in the *Laws*, Plato *does* specify the kinds of motions the soul engages in. He identifies them with 'wishing' (βούλεσθαι), 'investigating' (σκοπεῖσθαι), 'being diligent' (ἐπιμελεῖσθαι), 'deliberating' (βουλευέσθαι), 'opining truly and falsely' (δοξάζειν ὁρθῶς ἔψευσμένως), 'rejoicing' (χαίρουσαν), 'grieving' (λυπουμενὴν), 'getting riled' (θαρροῦσαν), 'fearing' (φοβουμενὴν), 'hating' (μισοῦσαν) and 'loving' (στέργουσαν).²⁹ Moreover, it is not difficult to classify these motions under one of Aristotle's four types.³⁰

However, Plato's list of psychological motions does not give a satisfactory answer to Aristotle's question. Aristotle is asking after the *one essential motion* that the soul must be in to remain a soul. In contrast, since the soul undergoes the above motions only occasionally, they belong to the soul only *per accidens*. In contrast, Aristotle wants to know which form of motion the soul possesses *per se*, and essentially, in order *to be* a soul.

However, Aristotle is also keen to make a different point, which is that a soul that is in motion naturally will have a determinate spatial location. This charge is odd, however, because in the *Laws* Plato seems to admit as much. Indeed, in *Leg.* 10, Plato splits the classes of beings that inhabit the cosmos into two: (1) the ones that are at rest, and (2) the ones that move.³¹

²⁸ *Phys.* 2.1, 192b8–9; *Phys.* 2.1, 192b14–15; *Phys.* 2.1, 192b33–4; Cf. *DC* 3.2, 301b17–19. Cf. *Phys.* 2.3, 194b26–28.

²⁹ *Leg.* 10, 897a1–3.

³⁰ Cf. *DA* 1.1, 403a25–7; *DA* 1.4, 408b5–11.

³¹ *Leg.* 10, 893b.

Within class (2), Plato lists ten types of motion, the tenth of which is a *self-moving motion* – which, as we saw above, he identifies as the definition and substance of the soul.³² Now, despite the fact that Plato argues that the soul's named self-motions are prior to any bodily motion,³³ he does *not* argue that these motions are prior to the existence of space (χώρα). Instead, Plato seems to accept that space is a necessary condition for *every* being, whether at rest or in motion.³⁴ Soul, in other words, according to the *Laws*, exists *somewhere* before it inhabits bodies.

3.5 Is Soul Spatially Located?

To explain why the spatial location of the soul (which Plato seems to admit) is a problem, Aristotle makes explicit reference to the imaginative component of the demonstrative heuristic. He writes:

Still, if it moves by nature (φύσει), it can be moved by force (βίῃ), and if by force, by nature. The same reasoning holds for the forms of resting (ἡρεμίας). For that state towards which (εἰς ὃ) something is moved by nature, is that state in which (ἐν τούτῳ) it rests by nature. Similarly, that state towards which something is moved by force, is that state in which (ἐν τούτῳ) it rests by force.³⁵ Even if we wanted to, it is not easy to form an image (πλάττειν) of what sorts (ποῖαι) of forced rests and motions will belong to soul. Still, if the soul is moved upwards, it will be fire, but if downward, earth; for these are the very motions of these bodies. The same account will apply to the intermediate bodies [*sc.* water and air]. (*DA* 1.3, 406a22–30)

Aristotle's complaint that we cannot 'fashion an image' (πλάττειν) of the motions and rests of the soul refers us back to his demonstrative heuristic.³⁶

³² *Leg.* 10, 894c.

³³ For the list of these motions, cf. *Leg.* 10, 896e8–897b5.

³⁴ *Leg.* 10, 893c1–2. Cf. *Leg.* 10, 896c9–d1. Cherniss (1944, 402) fails to recognise this point when defending Plato against Aristotle's charges. Themist. (*Paraphrasis in de Anima*, 16.19–35) discusses the criticism of one ancient critic who provided an extended argument against Aristotle that Plato did not identify the soul's motion as being 'with respect to location' (κατὰ τόπον). However, even if this were true, *Leg.* 10 shows that the soul's motion would still have to be 'in a location' (ἐν τόπῳ). Cf. Solmsen (1960, 175).

³⁵ Hett (1986) and Smith (1931), and the ROT misleadingly translate τούτῳ as 'the place', thus blurring the logical distinction between Aristotle's first and second argument. It is clear from the *Physics* that the phrase εἰς ὃ, as well as the phrase ἐν τούτῳ, refer indifferently to the result of any kind of motion, whether qualitative, quantitative, or local.

³⁶ Aristotle's use of πλάττειν, as Hicks (1907, 245) notes, also evokes Plato's method of giving a fictional account of possible objects and their properties through imagistic representation (which is opposed to sensory and intellectual representation). Cf. *Phaedr.* 246c6–d2; *Rep.* 9, 588b10–11.

As we saw earlier, it claims that an adequate definition of soul is one that is 'in accordance with imagination' (κατὰ τὴν φαντασίαν), and that, if a purported definition of soul does not lead to scientific knowledge of its *per se* attributes, or does not help us to plausibly guess (εἰκόσαι) what those attributes are,³⁷ we can infer that it was spoken 'dialectically' and is 'empty' of explanatory value. In the above passage, Aristotle actively applies the imaginative component of the demonstrative heuristic and claims that Plato's definition of soul does not meet it.

However, it is important to note that there are conditions on the imaginative test that Aristotle envisions: first, he assumes that the subject performing the test has accepted the truth of certain theses from *Phys.* 5.6 and *DC* 1.8. Both of these works argue that a natural state may be viewed either as a state, *R*, towards which an object moves by nature, or alternatively, as the state *in which* an object rests by nature.³⁸ For Aristotle, this teleological claim applies to all forms of motion or change, not just locomotive changes.³⁹ For instance, humans grow by nature towards a *quantitative* state of being a certain size, just as a sick animal alters by nature towards a *qualitative* state of health.

Thus, what Aristotle is asking us to do is imagine what such an end-state *R* would look like in the case of the soul moving itself to *R*, and, what the opposite of that state, *Q*, would look like. For example, if the soul were by nature a subject of *qualitative change*, then we might picture it moving towards a state of being healthy. If so, he argues, we should also be able to picture the external condition that would hinder the soul's health or make it sick. Similarly, if the soul were by nature the subject of *quantitative change*, we should be able to imagine it growing to a certain length, as well as the conditions that would forcefully hinder its growth. Aristotle's claim is that we are unable to imaginatively conceive, for scientific purposes, what any of these situations would look like. For this reason, Plato's definition of soul does not seem to pass the test of the demonstrative heuristic.

Aristotle also assumes as background scientific knowledge his theory that the elemental bodies are defined with respect to the places they tend to move and to rest in by nature:⁴⁰ 'down' is defined in reference to the 'place' at the centre of the world, whilst 'up' is defined in reference to the

³⁷ *DA* 1.1, 402b25–403a2.

³⁸ *Phys.* 5.6, 229b23–230a7; *DC* 1.8, 276a22–6.

³⁹ This is the conclusion of *Phys.* 5.6, 230b10–11. Cf. Ross (1936, 636). Cf. *Phys.* 4.8, 215a1–6.

⁴⁰ Cf. *DC* 3.2, 300a20–b8.

'place' at the circumference of the universe. On Aristotle's model, earthy matter, which we would today say is pulled towards the centre of the earth by gravity, moves 'down' towards its natural place of rest at the centre of the world. Similarly, fiery and smoky matter moves upward towards its natural place in the heavens at the circumference of the world.⁴¹ The intermediate elemental bodies, watery matter and airy matter, respectively, move towards a place above and a place below the extreme places of earthy and fiery matter.⁴²

If you try to imagine that your soul moves locally by nature, Aristotle says, then necessarily you imagine it moving towards a determinate place in the universe. However, since anything that tends by nature to move towards the place of an elemental body essentially is that elemental body,⁴³ then if you imagine your soul to move in this manner, you will implicitly be imagining it as that element but under another name. To imagine soul naturally going upward, for example, is just to imagine something that is essentially fire under another name.⁴⁴

What are we to make of this charge against Plato's soul? Plato, it seems, might reasonably respond that the natural motion of the soul is to move locally towards *whatever* place it wishes. However, if the soul were to move by nature towards whatever random place it wished, then its natural motion would be indistinguishable from its accidental motion. Hence, to make this revised Platonic conception of the soul's movement work, Plato would need to furnish a further reason why soul moves towards place *A* rather than place *B*. However, to do this is already to come within the vicinity of Aristotle's own view, which is that the soul moves by nature towards what appears to it to be good.⁴⁵

⁴¹ Cf. *Phys.* 4.5, 212b33–213a1.

⁴² *DC* 4.4, 312a22–b19.

⁴³ *DC* 1.8, 276b7–11.

⁴⁴ Cherniss (1944, 405–6, n. 332) is rightly puzzled about why Aristotle neglects to mention here the Platonic idea that the soul's natural motion might be axial rotation, the doctrine of the *Timaieus* which comes up for criticism at *DA* 1.3. He hypothesises that, because Aristotle himself argues in *DC* 1.2, 269a30–b17 that there is a fifth element (the so-called 'aether') whose natural motion is axial rotation, to raise the possibility that the soul might be moved in a circle here would, in effect, be to allege that there *is* a way we can conceive of the soul moving by nature, namely, if it were aether. However, if the natural place of aether is in the heavens above the other four elements, and if the soul were aether, it would exist by force in living bodies in the sublunary realm, and an account of its existence here would be called for. I thank Lindsay Judson for this point.

⁴⁵ See *DA* 3.10, 433b13–19.

3.6 Can Soul Resurrect the Dead?

Aristotle also offers another criticism of the idea that the soul could be self-moved *per se*. He argues:

Still, since it is apparent (φαίνεται) that soul moves (κινούσα) the body, it is reasonable (εὐλογον) to infer that it moves the body by passing along to it the same motions which it itself is undergoing. But if this is so, then by converting (ἀντιστρέψασιν) the terms, it will also be true that the motion that the body undergoes is the same motion as that the soul undergoes. But the body is moved with local motion (φορᾷ); the result is that the soul could change (μεταβάλλοι) over and against the body (κατὰ τὸ σῶμα) – either as a whole, or with respect to its parts (μόρια) moving their place (μεθισταμένη). But if this is possible, it could also, having departed (ἔξελθοῦσαν) from the body, be capable of entering (εἰσιέναι) it again; but in this case it would follow that dead animals could be resurrected (ἀνίστασθαι). (DA 1.3, 406a30–b5)

Aristotle's argument begins from a principle that both he and the Platonists agree upon: one of the soul's *per se* attributes is causing the body to move. However, given that the Platonists tried to justify their definition of soul by appeal to the idea that nothing can cause motion without being in motion, Aristotle now says that a reasonable option for explaining how the soul moves the body is to claim that the motions involved are homogeneous. Since living bodies are moved *locally* by the soul, a reasonable explanation of how a self-moving soul moves them is that it passes along its own local motion to them.

Aristotle labels this a 'reasonable' explanation of how a Platonic soul moves the body, not one that Plato actually affirms or denies. Even so, in *Leg.* 10, there is a tantalising suggestion that the cosmic soul's 'primary motions' (πρωτουργοὶ κινήσεις) (e.g. wishing, fearing) take over 'the secondary motions' (τὰς δευτερουργοὺς κινήσεις) of bodies in order to direct their physical processes (e.g. growth, diminishment, and separation and combination).⁴⁶ However, in the same discussion, Plato also concedes that it is possible that the cosmic soul drives the sun's orbits by being an internal mover, 'just as our soul carries us around in every direction' (καθάπερ ἡμᾶς ἢ παρ' ἡμῖν ψυχὴ πάντη περιφέρει).⁴⁷ This suggests that the reasonable explanation is one that Plato also thinks is reasonable.

⁴⁶ *Leg.* 10, 897a3–b1.

⁴⁷ *Leg.* 10, 898e9–10.

Aristotle's worry with identifying the soul's essential self-motion with local motion is that it depicts the soul's local motion as *prior* to, and not dependent upon, any motion that the body undergoes. This suggests that a locally self-moving soul should be able to move *into* locations – in whole or in part – which are outside of the body, and indeed, after having wholly vacated a previous bodily locale, return and resurrect bodies from the dead.

For both us and for the ancient Greeks, the idea that bodies can resurrect from the dead is a fantastic claim. Indeed, when ancient Greek literature countenances the possibility of resurrection, it always does so within a *supernatural* context.⁴⁸ Aristotle's allegation is that interpreting Plato's doctrine of the soul's self-motion in terms of local motion implies that resurrection would not only be a *natural* possibility, but also, one that we should observe fairly often.⁴⁹ The assumption behind this criticism is that, without a causal account of the soul–body relation which conforms in some manner to the *Axiom of Causal Association*, nothing prevents a Platonic soul as defined from being able to enter *any* body and make it move around (even a deceased one).

3.7 The Self-Destructing Soul

Aristotle also argues that, if the substance or essential activity of the soul consists in nothing more than the process of its moving itself; then based on his analysis of motion in the *Physics*, soul will exist if

⁴⁸ Cf. Hom. *Il.* 24.755. Among the most powerful statements of the impossibility of bodily resurrection is Aesch. *Eum.* 647–651, where Apollo declares that, once the dust has soaked up a man's blood and he is completely dead, there is no resurrection (οὔτις ἔστ' ἀνάστασις), because Zeus has made no spells (ἐπωδὰς οὐκ ἐποίησεν) for reversing death, despite the fact that he is able to reverse all other things (τὰ δ' ἄλλα πάντ' ἄνω τε καὶ κάτω στρέφων τίθησιν). The absurdity of natural resurrection is also assumed in Herod. *Hist.* 3.62.2–3, the latter of whom is quoted by Hicks (1907, 249). However, the idea that resurrection is *supernaturally* possible is widely affirmed. Euripides' *Alcestis* provides the best-known example. In this story, Heracles fights Death at Alcestis' tomb in order to bring her spirit back into her body, proving wrong the earlier claim by Admetus that, οὐκ ἔστι τοὺς θανόντας ἐς φῶς μολεῖν (Eurip. *Al.*, l. 1076). The moral of *Alcestis* is, according to the Chorus, that the gods can find a way for unseen and unexpected things (i.e. supernatural things) to happen (cf. *Il.* 1160–63), even though men cannot. Plato's myth of Er (*Rep.* 10, 614b2–21d3) also assumes the ability of the soul to return to the body, but Plato is at pains to point out that Er did not know *how* and in *what way* he was able to return to his decaying body (δπη μὲντοι καὶ ὅπως εἰς τὸ σῶμα ἀφίκοιτο) (*Rep.* 10, 621b5). The impossibility of natural resurrection is also of course the background of the claims of early Christianity. Cf. *Acts* 17:32.

⁴⁹ This would seem to follow even if there were other constraints on resurrection, such as the body not disintegrating in the meantime.

and only if it negates its own existence. He argues for this unusual consequence as follows:

But indeed, if it [*sc.* soul] moves itself (αὐτὴ αὐτήν), it will be moved (αὐτὴ κινεῖτ' ἑν), with the result that, if every motion is a displacement of the thing moved in the respect in which it is moved (ἐκστασίς ἐστι τοῦ κινουμένου ἢ κινεῖται), then soul will be displaced from its essence (ἐξίσταται ἄν ἐκ τῆς οὐσίας), if it does not move itself *per accidens*, but the motion belongs to its very essence *per se* (ἡ κίνησις τῆς οὐσίας αὐτῆς καθ' αὐτήν). (*DA* I.3, 406b11–15)

The difficulty of this argument can be somewhat alleviated by seeing its formal structure. Aristotle claims that accepting the Platonic definition of soul results in having to accept the paradox that soul, when it exists as self-moving, cannot exist as self-moving. It can be formulated as follows:

1. If soul moves itself, then soul is moved.
2. If any *x* is moved, then *x* changes from being some *F* to not being *F*.⁵⁰
3. But soul is moved with respect to its own essence (οὐσία).⁵¹
4. The essence of the soul =_{def} 'being moved from itself'.
5. Thus, when soul is, it necessarily changes from 'being moved from itself' to not 'being moved from itself'.
6. Hence, when soul is, it will not be soul.

Whilst commentators have recognised⁵² that this argument appears to be a refutation of the claim of the *Phaedrus* that what is self-moving never abandons (ἀπολείπειν) itself,⁵³ they have not generally noticed that Plato himself, in places outside of the *Phaedrus*, seems to suggest something very like what Aristotle asserts here.

One place he does so in is *Rep.* 2, where he has Socrates argue that anything that 'departs from its own form' (ἐξίσταται τῆς αὐτοῦ ιδέας) is necessarily either (i) changed by its own agency (αὐτὸ ὑφ' ἑαυτοῦ μεθίστασθαι), or (ii) changed by the agency of something else (ὑπ' ἄλλου).⁵⁴ Socrates goes on to argue that, in general, things in the *best* state, such as the bravest and most intelligent souls, are least able to be changed by

⁵⁰ Cf. *Phys.* 4.12, 221b3; *Phys.* 4.13, 222b16; *Phys.* 6.5, 235b8–13. However, at *Phys.* 8.7, 261a20–1, Aristotle claims that locomotion dislodges a thing from its οὐσία the least.

⁵¹ Cf. Shields (2007, 153); Menn (2002, 97, n. 20).

⁵² For example, Philop. (*In de anima*, 113.19), Hicks (1907) and Menn (2002, 97).

⁵³ *Phaedr.* 245c7–8. Cf. *Phys.* 6.5, 235b8–13, where Aristotle uses ἐξίσταται as synonymous with ἀπολείπει.

⁵⁴ *Rep.* 2, 380d8–e1.

something else.⁵⁵ However, he infers that, since there is no *better form* for the best things (e.g. the best souls, and the gods) to change *themselves* into, there is no reason why the best things would *ever* change themselves, for they would have to change into *worse* forms.⁵⁶

Crucially, Socrates argues that such a self-change *cannot* be understood simply as a change in external appearance, like putting on a mask. Instead, he argues that, if a thing alters its form, then it changes into something that is worse than *itself*.⁵⁷ This implies that, for Plato, a thing's identity depends on its not altering in form. If so, then a thing which reflexively moves *itself* will also alter its own form (or, alternatively, move itself *out of* its own form), and thus change into something else.

Whilst someone might object that Plato's argument in the *Republic* is formulated in terms of something *altering* itself (and so, may not apply to other forms of self-motion), in the *Cratylus*, he gives a stronger version of this argument that ranges over motion in general. In this dialogue, Socrates claims:

So how could that which is never in the same state *be* anything? For if there is ever a time it holds in the same state, it is clear that at that time nothing will be changing; but if it always holds in such a state and is always the same, how could this be changed or moved (μεταβάλλοι ἢ κινοῖτο), unless it departs from its own form (ἐξιστάμενον τῆς αὐτοῦ ἰδέας)? (*Crat.* 439e1–5)

The important ideas in this passage are that: (1) a thing cannot *always* be changing out of its form and still be a determinate object, and (2) a thing cannot be changed *at all* unless it is dislodged from its form.⁵⁸ This suggests that, for Plato, being dislodged from a form is a basic way of understanding what motion is. If so, then Plato is committed to two propositions that are in tension with one another: (P1) the soul is always moving itself, and (P2) whatever is always in motion, or moved by itself, or moved by something else, is displaced from the form that fixes its identity.

Aristotle could hardly have been unaware of these arguments. Seen in this light, his criticism may be read as the claim that, *according to both his and Plato's analysis of motion*, if the soul moves itself – and soul is identical to its essence – then it can only move itself by changing into something different from, or worse than, its own essence. If so, then soul has been defined by Plato by a property that essentially entails the impossibility of its existence.

⁵⁵ *Rep.* 2, 381a3–4.

⁵⁶ *Rep.* 2, 381c1.

⁵⁷ *Rep.* 2, 381b10–11.

⁵⁸ Cf. *Tim.* 50b7–9, where the receptacle is said never to depart (ἐξίσταται) from its own power of being receptive, despite always receiving various forms.

Did Plato have a solution to this problem? The answer is ‘yes’, and it is put forward in the *Timaeus*. This dialogue interprets the idea of self-motion in terms of the geometrical structure of *circular rotation*. As a resolution to the above puzzle, it plausibly captures both the idea that every part of soul is always displaced (out of a specific place during a rotation), whilst at the same time, remains the same (insofar as every displaced part of soul is immediately occupied by another part of soul). To challenge this depiction of the soul as being in essence a perpetually revolving circular motion, Aristotle gives a complex analysis of theoretical and practical thinking as being disanalogous to motion in general, and circular motion in particular, which I have discussed elsewhere.⁵⁹

3.8 Is Soul Moved *Per Accidens*?

Having run through various problems connected with the assumption that the soul is moved *per se*, Aristotle also explores whether the Platonists could defend their definition of soul by claiming that it is in motion *per accidens*. He writes:

But with respect to motion *per accidens* (κατὰ συμβεβηκός), soul can certainly be moved by something different (ὑφ’ ἑτέρου); for a living being might be pushed by force. But what has ‘being moved from itself’ in its essence (τὸ ὑφ’ ἑαυτοῦ κινεῖσθαι ἐν τῇ οὐσίᾳ) cannot (οὐ δεῖ) be moved by another agent (ὑπ’ ἄλλου), except *per accidens* (πλὴν εἰ μὴ κατὰ συμβεβηκός), just as what is good *per se* (τὸ καθ’ αὐτὸ ἀγαθόν) cannot be for the sake of something different (ἑτέρου ἕνεκεν), and what is good on account of itself (δι’ αὐτό) cannot be a means to something else (δι’ ἄλλο εἶναι). But someone might more reasonably say it could be moved (κινεῖσθαι) by perceptible objects (ὑπὸ τῶν αἰσθητῶν), if it is moved (κινεῖται). (DA 1.3, 406b5–11)

Aristotle admits here that the soul can be moved *per accidens*. However, he argues that this offers no evidence in favour of Plato’s definition of soul.⁶⁰ His point is simple: one cannot defend the possibility of the soul’s essential

⁵⁹ See DA 1.3, 406b26–407b26, and Carter (2017).

⁶⁰ This criticism has a dialectical precedent in *Top.* 4, where Aristotle refers to someone who defines the soul as ‘something moved by itself’ (τὸ κινούμενον ὑφ’ αὐτοῦ) (*Top.* 4.1, 120b22–3). He argues that the medio-passive participle ‘thing moved’ does not fall under the substantial category of τί ἐστι because ‘thing moved’ signifies something that falls under the accidental category of doing or suffering (ποιοῦν ἢ πάσχον), just as ‘white’ does not signify *what* ‘snow’ is, but rather *how* it is qualified (*Top.* 4.1, 120b27). Cf. Waterlow (1998, 162–3), who discusses the grammatical implications of these participles of motion *sans* their connection with accusative and genitive personal pronouns.

self-motion by appealing to the natural and forced motions of the thing the soul is in (i.e. the living body). This is because the body's motions, forced or natural, are not included within the scope of the soul's definition as a self-mover. The motions that the body suffers, as Aristotle argued earlier, will at best be contained or restrained motions of the soul.

Aristotle elucidates this claim further by appealing to a standard distinction between things that are good *per se*, and things that are instrumentally good. The idea is a definitional one: any *x* laid down as being good *per se* is, by definition, something that is not, as such, instrumental for producing another good, *y*. In the same way, any *x* laid down as desirable *per se* is by definition something that, as such, is not desirable instrumentally for another desirable thing, *y*.

What Aristotle means by this is not that it is impossible for someone to desire a *per se* good, *x*, for the sake of some other good, *y*; indeed, he explicitly allows that some goods are both desirable for themselves and for the sake of other things.⁶¹ His point is only that, *if* someone desires some *per se* good *x* for the sake of some other good *y*, then one is not desiring *x* for what *x* is *per se*. Similarly, one cannot justify the claim that motion belongs to the soul *per se* by grounding this property in an item – namely, the body – that causes the soul to be in contained or restrained motion *per accidens*.

However, Aristotle also offers us what seems to be a hylomorphic suggestion. He claims that, if the soul is moved, it is moved by perceptible objects.⁶² The suggestion is that, *if* we define the soul in terms of its being moved, given the problems specified above, we might have more luck defining it not in terms of its being moved 'from itself', but in terms of its being moved 'by perceptible objects'. However, Aristotle holds off from discussing this possibility until he reviews definitions of soul aimed at explaining the soul's *per se* attribute of causing (perceptual and intellectual) cognition.

3.9 The Results of Aristotle's Criticism of Plato

The results of testing out Plato's definition of soul as a self-moving thing (or self-moving motion) have shown that, since this kind of soul cannot be imagined in accordance with the demonstrative heuristic to be something which essentially and *per se* undergoes a known form of motion, it must

⁶¹ *NE* 1.7, 1097a34–1097b5.

⁶² Cf. *Phys.* 7.2, 244b10–245a2.

therefore be a 'dialectical' or 'empty' definition. Even so, the results of Aristotle's criticism allow him to make progress by placing both positive and negative constraints on his inquiry. Negatively, these results act to constrain Aristotle from affirming that self-motion belongs to the essential definition of soul. Positively, they offer a hint as to the kind of being the soul might be.

Many commentators agree that Aristotle's criticisms express, in one way or another, the idea the soul is not the *sort of thing* that can be moved *per se*.⁶³ However, there are plenty of beings in Aristotle's ontology that are not the sorts of things that can be moved *per se*. As Aristotle's own examples show – quantities, qualities, relations, places, and states also cannot be moved *per se*. In general, objects in *any* category of being other than natural composite substances possessing magnitude are incapable of undergoing motion *per se*.

If so, we need a way to understand how using the demonstrative heuristic to test Plato's definition of soul provides Aristotle with a positive constraint on what sort of thing it is, which would help to lead him toward one or more of his five hylomorphic theses about soul. Given the number of times Aristotle has tested the explanatory power of the Plato's definition of the soul based on premises drawn from his works on natural philosophy, the answer is to be found, I suggest, in Aristotle's concept of nature (φύσις).

Aristotle defines things that exist *by nature* as things that possess an inner principle of motion and rest (ἐν ἑαυτῷ ἀρχὴν ἔχει κινήσεως καὶ στάσεως),⁶⁴ and *nature* as a principle and cause of being-moved and resting *to* those things in which it belongs primarily (ἀρχὴς τινὸς καὶ αἰτίας τοῦ κινεῖσθαι καὶ ἡρεμεῖν ἐν ᾧ ὑπάρχει πρῶτως).⁶⁵ Given this understanding of nature, and the arguments Aristotle gives against the soul's ability to be moved *per se*, one might think that he has argued himself into a corner: either soul is to be classed as a *natural* object, or it is to be classed as an *unnatural* object. But soul cannot be a natural object, because natural objects are *per se* subject to motion and rest, but soul is not. Therefore, soul must be an unnatural object. But soul cannot be an unnatural object, for then *no part* of soul can be studied by the natural scientist, contrary to the expressed conclusions of *DA* 1.1.⁶⁶

⁶³ E.g. Shields (1988a, 2007); Witt (1992).

⁶⁴ *Phys.* 2.1, 192b13–14.

⁶⁵ *Phys.* 2.1, 192b21–22.

⁶⁶ Cf. *DA* 1.1, 403b9–19.

However, there is a third possibility. Although it is never made explicit in *De Anima*, it seems to capture accurately what Aristotle may be suggesting here. This is the idea that soul *is* the φύσις or internal principle of motion and rest of living beings.⁶⁷ In fact, Aristotle has already hinted at this view at the outset of *DA* 1.1, where he claims that soul is a 'kind of' principle of animals.⁶⁸

Whilst it is true that, in *Phys.* 8.4, Aristotle claims that the φύσις of animals differs from the nature of the material elements in that the former are self-movers,⁶⁹ this account still leaves open the possibility that the *mixture* of certain elemental composites will account for the nature of self-motion in animals. The position that soul is *itself* identical to the φύσις of a living being is a more radical view: it would mean that soul, and not the nature of the elements, is that which *initiates* the self-movement and resting of animals without itself being moved *per se*, just as the unmoved movers inhabiting the heavenly bodies initiate motion without being moved *per se*.⁷⁰

Aristotle's arguments have shown that, according to the demonstrative heuristic, Plato's definition of soul neither functions as a good definition of soul, nor provides an adequate explanation of how it moves the body. The route towards hylomorphism begins with the idea that soul is not a natural moving *object* filling up space, such as a material element. However, this leaves open the idea, as the *Hylomorphic Thesis* states, that it is the inner (formal) nature of such an object, since it is able to cause certain forms of motion and rest in it, just as a φύσις does.

We now have our first solid story about why Aristotle takes the time in *DA* 1.2 to present (in condensed form) the reasoning that led Plato to define the soul as a 'self-mover', and why he carefully criticises this view in *DA* 1.3 in accordance with his demonstrative heuristic. He does the former because he thinks this definition of soul is meant to be explanatory of one of the soul's two *per se* attributes. He engages in the latter because, by testing the adequacy of this definition, he is able to show that Plato's self-moving soul, whether considered to be in motion *per se*, or in motion

⁶⁷ Cf. *DA* 1.1, 402a7–8. Of the eighteen times ψυχή is referred to explicitly in the *Physics*, it is never identified *as* the φύσις of an animal. In fact, *Phys.* 7.3, 247b17–18 suggests that the soul is subject to natural motions of its own – which would entail that it has its *own* inner principle of motion. It is not until *PA* 1.1, 641b4–9 that Aristotle is confident enough to claim that soul, or some part of it, is a principle of motion *and* a φύσις.

⁶⁸ *DA* 1.1, 402a6: ἐστὶ γὰρ οἷον ἀρχὴ τῶν ζῶον.

⁶⁹ *Phys.* 8.4, 255a5–10. Furley (1994) is a *locus classicus* on this subject.

⁷⁰ See Kelsey (2003).

per accidens, seem to lead to a number of false consequences that are in conflict both with the principles of his natural science and with known empirical phenomena.⁷¹ For this reason, it is justifiable for him to think that Plato's definition of soul neither produces scientific knowledge of, nor facilitates an easy guess about, the soul's *per se* attributes.

Aristotle's criticism of Plato's theory leaves him with very few options for determining its identity within the confines of his *Physics*. If he is right that soul is neither a supernatural being, nor a natural hylomorphic composite, and yet, is still a subject investigated by the natural philosopher, he is under a constraint to identify soul as the principle *of* an animate being. Only in this way can he preserve the ideas that soul (i) can produce motion in a body, (ii) cannot be moved *per se*, and (ii) can be moved *per accidens*. Idea (i) naturally leads towards the *Efficient-Final Causal Thesis*, since it affirms the soul's status as an efficient cause of an animal's local motion. However, ideas (ii) and (iii) naturally lead to the *Hylomorphic Thesis*, since they say that the way in which the soul is *not* subject to motion is like the way in which qualitative forms (e.g. being white) and numerical forms (e.g. being three-cubits) are not subject to motion.

⁷¹ Cf. Cherniss (1944, 412).

Democritus' Psychology

So even Democritus himself, they say, said he wished rather to find a single causal explanation than to acquire the kingdom of the Persians.

Eusebius, *Preparation for the Gospel* 14.7.4

4.1 Introduction

Although Aristotle often speaks of the atomist philosophies of Democritus of Abdera (ca. 460–370 BCE) and Leucippus of Elea (or Miletus) (ca. fifth century) together, for the purposes of his scientific inquiry into the soul, it is the former philosopher who is of the most interest to him. It is not hard to see why. If we trust the ancient testimonia concerning the volume of published works attributed to Democritus, he was marvellously prolific. In contrast to Leucippus, who probably wrote only one work, the *Great Cosmology* (Μέγας διάκοσμος),¹ Diogenes Laertius records that Democritus' works were arranged by Thrasyllus into an astounding thirteen tetralogies, whose contents ranged from philosophical topics such as ethics, cosmology, and geometry, to cultural and practical issues, such as a dictionary of Homeric words and a textbook on farming.² The fourth of these tetralogies, four books on nature, refer to topics highly relevant to Aristotle's project in *De Anima*. Book two was said to be titled, *On Human Nature* (Περὶ ἀνθρώπου φύσις) or *On Flesh* (Περὶ σαρκός), book three, *On Mind* (Περὶ νοῦ), and book four, *On Perceptions* (Περὶ αἰσθησίῳ). We also know that Aristotle was clearly impressed with the quality of some of the theories given in these works.³

¹ DK67 B(ia) = TEGP 8.

² DK68 A33 = TEGP 7.

³ Cf. *GC* 1.2, 315a3–b1.

I first argue that, more than any other earlier theory of soul, Aristotle thinks that Democritus' theory rivals his own insofar as it has the virtue of formally satisfying the demands of the demonstrative heuristic. Aristotle thinks that Democritus' definition of the soul provides a plausible explanation of life, and both of the soul's *per se* attributes – the ability to cognise and to move the body (Sections 4.2–4.5). However, I then argue that Aristotle also thinks that Democritus' psychology has one of the worst vices of any predecessor theory of soul. This vice is not being too mechanistic, as many commentators have held.⁴ Instead, it is that his theory of soul entails an implausible epistemology and theory of action (Section 4.6). These theories, I argue, are in conflict with Aristotle's belief that the soul's grasp of true propositions is of a different order than its grasp of perceptible objects, and his belief that the soul has a cognitive power whose intentionality is fundamental to the explanation of animal motion. Finally, I claim that his comparison of Democritus' soul-atoms to quicksilver poured into a statue of Aphrodite is a muddled, but intelligible attempt to ascribe a form of free will to the soul (Section 4.7).

4.2 Aristotle's Account of Democritus' Psychology

Aristotle first discusses Democritus' theory of soul in *DA* 1.2 by linking him, like Plato, to the group of theorists who argued that the soul is something in motion. He writes:

Democritus claims that the soul is a certain kind of fire and heat; for on the assumption that the atoms and their shapes are infinitely many, he claims that the spheres are fire and soul (these are like those dust particles in the air which are called motes, which appear in sunbeams coming in through windows) – and of those atoms, he claims that the mixture of all the seeds are the elements constituting the whole of nature (as Leucippus also claims), and that amongst these atoms the spherical ones are soul, because they are most of all able to slip (διόδύναι) through all things, in virtue of being this sort of shape; and being in motion themselves, he claims they are able to move the other atoms, on the assumption that the soul is that which provides movement to animals. (*DA* 1.2, 403b31–404a9)

As with Aristotle's account of Plato's psychology, it is apparent that Aristotle is concerned here with more than just an overview of atomist beliefs about the soul. What stands out is that he also takes pains

⁴ E.g. Cherniss (1935, 303).

to show the explanatory reasons that led Democritus to identify it with spherical atoms and fire.

Aristotle begins by reviewing the atomist doctrine that every object in the cosmos consists of physically indivisible and imperceptibly small atoms (ἄτομα) or shapes (σχήματα) moving through the infinite void. From other sources, we also know that along with the properties of intrinsic indestructibility and indivisibility,⁵ Democritus assigned to the atoms the basic properties of shape (ῥυσμός), rotational orientation (τροπή), and arrangement (διαθιγή) within an atomic complex.⁶ He claimed that, as atoms travel through the void, they either move one another by impact (πληγή) into new directions of travel or orientation,⁷ or, they stick together in virtue of their interlocking surface shapes (ἀντιλήψεις), such as angles and hooks.⁸ The implication is that, when enough atoms interlock, they form the macro-level composite objects we find at the level of sensory perception.

According to our passage, Democritus believed that the nature of soul, if located anywhere, would be amongst the infinite variety of atomic shapes that he judged to be the most fundamental parts of reality. Aristotle claims that Democritus made progress on the nature of soul by speculating on the geometrical properties that would help to explain why it was most of all able to penetrate a perceptible body in order to animate it, and most of all able to serve as that body's primary mover. The atom fitting these geometrical constraints, Democritus concluded, is the sphere.

If we take into account Democritus' undoubtable achievements in mathematics and his attempts to explain perceptible phenomena by means of atomist principles,⁹ there is no good reason to doubt that the reasons Aristotle supplies here for thinking that the soul is composed of round atoms are the very ones Democritus gave in one of his lost works.

⁵ DK68 A14 = TEGP 23.

⁶ DK68 A6 = TEGP 10[F4]; DK68 A38 = TEGP 24.

⁷ TEGP 34. Cf. TEGP 33 = Cic. *De Fato* 20.46.

⁸ DK68 A37 = TEGP 12[F5]. However, the exact nature of atomic contact is disputed, with one ancient author asserting that atoms do not really touch. Cf. Philop. (*In de gen. et corrupt.* 158.27–159.3) = DK68 A7 = TEGP 40. On whether or not this is an interpretation of Philoponus, or something that Democritus may have actually held, cf. Taylor (1999, 186–8) and Mansfeld (2007).

⁹ See Warren (2007, 165–6).

Aristotle represents Democritus as having reasoned out the identity of soul and spherical atoms by an argument of the following sort:

1. [A] Soul belongs_{per se} to [B] the kind of atom most of all able to penetrate into animal bodies and provide motion to them.
2. [B] The kind of atom most of all able to penetrate into animal bodies and provide motion to them belongs_{per se} to [C] spherical atom.
3. [A] Soul belongs_{def} to [C] spherical atom.¹⁰

Although Aristotle does not tell us why Democritus thought that spherical shape made soul atoms most of all ‘able to slip through everything’ (διὰ παντός δύνασθαι διαδύνειν), or why this shape would help it to move other atoms, we can reconstruct how he might have reasoned.

Since a sphere, unlike other atomic shapes, has no hooks or angles that can catch on other atomic bodies, if sufficiently small, it would – more than any other atomic shape – be able to slip through the pores running through atomic aggregates without becoming snagged. Moreover, because every atom possesses the ability to impact and rebound off other atoms, it is plausible to think that the uninterrupted motions of spherical atoms would cause a higher number of impacts than other atomic shapes. This power helps to explain why, when spherical atoms remain inside an animal body, they can also serve as that body’s primary mover.

The drawback to this account, which Aristotle neglects to mention, is that it raises questions about the soul’s ability to serve as a unified cause of the body’s motion. Precisely because spheres *cannot* interlock so as to form macro-level objects in the way that hooked atoms can, if Democritus thought that our soul atoms were more than a mere heap of particles accidentally flowing together in our bodies, he must have allowed that atoms can form unities in other ways. For instance, he may have thought that they can be pressurised and channelled through narrow bodily passages;¹¹ or, that they have basic dispositional properties, such as attraction (to like atoms) and repulsion (from unlike atoms). If so, he may have imagined spherical atoms, being alike in nature, to

¹⁰ Although Aristotle represents this argument in the ‘order of discovery’, Vlastos (1945, 579, n. 9) points out that taking the argument in the reverse (as he reads it) provides an ‘elegant deduction’ of the soul’s ability to move the body.

¹¹ Cf. DK68 A93a = TEGP 80; DK68 A25 = TEGP 81.

coalesce and move together like liquids.¹² Aristotle's later comparison of Democritus' aggregate of spherical atoms to flowing mercury poured into the statue of Aphrodite by Daedalus suggests that Democritus may have been attracted to both of these pictures.¹³ That Aristotle thought some such idea of dynamic unity is implied by Democritus' picture of the soul may also be evidenced from the fact that when he comes to criticise the latter's psychology, he does not criticise it, as he does other psychologies, on the grounds that an atomic soul lacks real unity.

However, Aristotle did not think that Democritus' explanation of the nature of soul ended here. Looking more closely at the passage, he also ascribes to him an argument identifying the soul with a kind of fire and heat. Syllogistically, it can be formulated:

1. [A] Soul belongs_{def} to [B] spherical atoms.
2. [B] Spherical atoms belong_{def} to [C] fire/heat.
3. [A] Soul belongs_{def} to [C] a certain fire/heat.

Importantly, Aristotle reports that the conclusion to this deduction is not that soul is fire *simpliciter*, but a *kind* of fire (πῦρ τι) or heat.¹⁴ If this qualification is not a mere slip of the stylus, then Democritus did not believe that the soul was strictly and universally identical to every heap of spherical atoms. If he did, he would be committed to calling every macro-level collection of spherical atoms – forest fires, candle flames, the warmth rising from a stove, etc. – an instance of soul. Since Aristotle is highly critical of this sort of panpsychism, but does not mention it here, it is unlikely that he thought Democritus was committed to it. Aristotle thus seems to think that Democritus identified soul with some subset of the spherical atoms that compose fire, in virtue of which we can assign to him a definition of soul:

Soul =_{def} a certain collection of the spherical atoms that constitute fire/heat.

¹² Cf. KRS (1983, 427 f.1). Cf. DK68 A38 = TEGP 24, where Simplicius mentions the unusual doctrines that atoms of the same shape are carried towards one another by nature, and moved by one another by nature. If Democritus thought that atoms had weight, as Aristotle affirms (DK68 A60 = TEGP 36), both features may be explained by appeal to the theory of vortices in which like atoms can be sifted out. Cf. Chalmers (1997). However, if Democritus denied that atoms had weight (DK68 A47 = TEGP 32), then these powers may have been posited by Democritus as dispositional powers of atoms. Cf. Mourelatos (2005).

¹³ *DA* 1.3, 406b15–22.

¹⁴ As Philop. (*In de anima*, 105.19–20) rightly points out.

From this basic account, Aristotle thinks, Democritus attempted to explain all the basic phenomena associated with the soul, including life itself.

4.3 Democritus' Explanation of Life

Alongside Democritus' definition of soul, Aristotle also discusses its connection to the phenomena of breathing and animal life. As we saw above, one of the features that Democritus ascribes to soul is the ability to penetrate through bodies. On its own, ascribing this feature to soul does not make much sense, as it does not appear to be linked to either of the soul's *per se* attributes. However, as Aristotle's review continues, the reason for Democritus' addition of penetrative power to the list of its attributes becomes clearer.

Democritus used the property of being penetrative to explain the phenomenon of animal life. This he took to be identical to the maintenance of soul atoms in the body through respiration (ἀναπνοή). His explanation of respiration crucially depends on there being a type of atom that can penetrate and pervade the environment of living beings (and especially air) to be available to breathing animals. Aristotle writes:

For this reason, he [*sc.* Democritus] took the mark of life to be respiration (ἀναπνοή); for when the bodies among the shapes are compressed together by what surrounds (περιέχοντος) and forced out – i.e. the shapes which provide movement to animals in virtue of never themselves resting at any time – a help comes from outside when other atoms of this sort come in after them in respiration. For these [atoms from outside] prevent the atoms residing inside the animals from being expelled, helping to restrain that which causes contraction and freezing; and they live as long as they are capable of doing this. (*DA* 1.2, 404a9–16)

Democritus thus argues that there is a scientific explanation for why respiration is the mark of life. It can be formulated as follows:

1. [A] Life belongs_{per se} to [B] what prevents spherical/soul atoms in the body from being lost due to external contraction and freezing.
2. [B] What prevents spherical/soul atoms inside the body from being lost due to contraction and freezing belongs_{per se} to [C] things that respire.
3. [A] Life belongs_{per se} to [C] things that respire.

Democritus' account of respiration provides a natural explanation for why, when animals stop breathing, they cease to live. It rests upon the empirical observation that there are always external forces from the

environment acting upon animal bodies (e.g. cold and air pressure), which forces, interpreted within atomist theory, can be understood to push out smaller life-constituting soul atoms within animal bodies. This pushing out, Democritus claims, is identical to the phenomenon of exhalation. Since to be alive, for Democritus, is nothing more than maintaining a sufficient quantity of warm soul atoms within the body, he saw inhalation as the mechanism that counteracted the forces that produce exhalation. Aristotle will offer a general criticism of respiratory theories of soul later (see Chapter 9, Section 9.6), but he saves his full refutation of Democritus' theory of respiration for his tractate, *On Respiration*.¹⁵

4.4 Democritus' Explanation of the Soul's Cognition

Aristotle also reports that Democritus wanted his theory of soul to be explanatory of the other *per se* attribute of soul, being cognitive. He writes:

For he [*sc.* Democritus] claimed that the soul, without qualification, is identical to mind (νοῦν); for he claimed that what is true (τὸ ἀληθές) is that which appears (τὸ φαινόμενον) [in perception], on which basis he said Homer was right to say that, 'Hector lay thinking altered thoughts' (ἀλλοφρονέων).¹⁶ Hence (δὴ), he does not make use of mind as a certain power concerning truth, but says that soul and mind are the same thing. (*DA* 1.2, 404a27–31)

We need to take Aristotle's testimony about Democritus' identification of mind and soul carefully.¹⁷ We should first guard against the view that he

¹⁵ In *Resp.* 4, Aristotle elaborates upon the atomist theory reported here by emphasising Democritus' identification of spherical atoms with 'the hot' (τὸ θερμόν) (*Resp.* 4, 472a4), rather than with fire, and his description (not identification) of the surrounding air that pushes out soul atoms as cold (ψυχρόν) (*Resp.* 4, 472a33). However, Aristotle's criticism of this explanation of breathing, unlike the criticisms that feature in *DA* 1.3–5, makes explicit use of his four-causal theory.

¹⁶ In our received manuscripts of Homer, it is not Hector who lay thinking altered thoughts, but Euryalus, after being knocked in the head in boxing match. Cf. Hom. *Il.* 23.698. Although it is common to ascribe this to a failure of Aristotle's memory, he may quoting Democritus, who is claimed by Diogenes Laertius to have written a work entitled, *On Homer, or on Correct Diction and Words*, in which case the mistake might be Democritus'. There is also a distinct possibility, pointed out to me by Edward Hussey, that Aristotle is correctly quoting from the lost epic poem *Aethiopsis* that was attributed by some to Homer.

¹⁷ One reason for this is that Theophr. *De Sensibus* 58 = DK68 A135 = TEGP 113 provides a report about Democritus' account of correct thinking (φρονεῖν), according to which it occurs when the soul holds in proportion (συμμέτρως ἐχούσης) – either (following Diels) 'in accordance with its mixture' (κατὰ τὴν κρήσιν), or, following the MSS, 'after a motion' (μετὰ τὴν κίνησιν). I take it that, on either reading, the point is that when the soul is too hot (e.g. it has too many hot atoms) or too cold (too few hot atoms), the atomic films one thinks are distorted, making correct thinking a power subject to the same bodily conditions as perception.

is claiming that Democritus held that there is no difference at all between intellectual and perceptual forms of cognition. Rather, he is claiming that Democritus, because of certain things he said, is *committed* to the view that mind is not a special power of the soul *over and above* its capacity for perceiving appearances.¹⁸

We should also guard against the temptation to assume that Aristotle is claiming that Democritus embraced Protagorean relativism, the doctrine that there is no objective truth about anything, but only subjective truths experienced by individual perceivers.¹⁹ This becomes clearer once we compare Aristotle's report above to a similar account he gives in *GC* 1.2, 315b6–10, wherein he claims that, since the truth (according to the atomists) is in what appears, but the appearances (τὰ φαινόμενα) are opposite and infinite, the figures that cause the appearances must therefore be infinite (and opposite).²⁰

For Aristotle's two accounts to be consistent, he must have thought that Democritus held that all perceptual appearances are true *relative to each individual*, and at the same time, that no perceptual appearance captures the *objective* sub-perceptual realities proposed by atomic theory. In other words, the argument of *GC* 1.2 shows that the objective truth of an infinite number of atomic figures *explains* the 'infinite' and contradictory subjective truths we experience in perception.²¹

Based on this account, we can square Aristotle's claim that, for Democritus, what is true is identical to what appears, with some of the fragments of Democritus' works that are often thought to tell against it. For instance, Democritus claims that all the secondary qualities that we experience in perception (such as colours, tastes, and sounds) only exist 'by convention' (νόμῳ) in comparison to the atoms and the void which exist 'in reality' (ἐτεῆ) (DK68 B9 = TEGP 136[F33]).²² If the above

¹⁸ Although Philop. *In de anima* 71.19–34 = DK68 A113 claims that we lack textual evidence for Democritus' verbal identification of mind and soul, Aristotle seems to presuppose some such evidence in *Resp.* 4, 471b30–472a18 = DK68 A106 = TEGP 114. Regardless, he is right that, in *De Anima*, Aristotle argues for the identity of the two faculties based on their common object.

¹⁹ See Lee (2005). Plut. (*Adv. Col.* 4, 1108f) = DK68 B156 = TEGP 13[F6], reports that Democritus harshly opposed the perceptual relativism of Protagoras.

²⁰ Barnes (1982, 364) notes that the argument so presented is a 'thunderingly bad one'. He suggests that it was originally dependent upon the argument reported by Simplicius in DK68 A38 = TEGP 24. This argument is that, given the existence of atomic figures, and given that there is no more reason for a figure to be of one kind (e.g. rectilinear) than another (e.g. circular) (διὰ τὸ μηδὲν μάλλον τοιοῦτον ἢ τοιοῦτον εἶναι), it follows that all figures are instantiated in nature.

²¹ A similar argument, based upon the infinite (or indefinite) number of shapes of perceptible bodies, is reported at *DC* 3.4, 303a10–12.

²² See Lee (2005).

interpretation is right, this need not mean that judgements that rely upon such conventions are *false*, but only that they are not *ontologically basic*.²³ So, on this reading, Democritus could be said to have believed that what is false is that conventional perceptual judgements are true as *basic descriptions of objects*. However, this is consistent with the idea that every perceptual judgment is true relative to the individual (e.g. it is true that what appears to me to be hot is hot, even if it is true that what is hot to me is cold to you, in virtue of a basic atomistic description of our respective mental states).

Aristotle's report that Democritus once claimed, 'either nothing is true, or it is unclear to us' (*Metaph.* Γ.5, 1009b7–15 = DK68 A112 = TEGP 120) can be interpreted in the same way. If Democritus holds that no perceptual appearance is truer than its opposite, then either the law of non-contradiction is to be rejected, or we must believe in a different (and more unclear) kind of truth explaining the contradictory perceptual appearances. This seems to be the route that Democritus took, which is why he can say things like, 'In reality we know nothing; for truth is in the depths' (DK68 B117 = TEGP 141),²⁴ and, 'to know what kind of thing each thing is in reality is impossible' (DK68 B8 = TEGP 136[F37]).²⁵ Admittedly, we cannot base too much on these claims, since we do not know the surrounding philosophical context in which Democritus asserted them. However, for my purposes, it is enough to show that Aristotle need not be making inconsistent claims about Democritus' epistemology. Instead, we are justified in thinking that he is offering a charitable interpretation that tries to make sense of Democritus' psychology as a whole.

However, if Democritus believed that atomist theory captures the basic ontological truths about reality, in contrast to the various relative truths of perception, does this not imply that Aristotle must be wrong to claim that Democritus did not make use of mind as a separate power concerning truth? We find evidence weighted against Aristotle's report in a crucial epistemological fragment provided by Sextus Empiricus. He records that Democritus claimed that there are two forms of knowledge (γνώμης) that humans have, one of which seems to concern perceptual

²³ See Taylor (1999, 220).

²⁴ ἔτεῃ δὲ οὐδὲν ἴδμεν· ἐν βυθῷ γὰρ ἡ ἀλήθεια.

²⁵ καίτοι δῆλον ἔσται ὅτι ἔτεῃ οἶον ἕκαστον γινώσκειν ἐν ἀπόρῳ ἐστί.

truths, and the other of which seems to concern intellectual truths.²⁶ The fragment reads:

Of knowledge (γνώμης) there are two forms, one genuine (γνηστή) and one bastard (σκοττή). Of the bastard form are all of these: sight, hearing, smell, taste, touch. But the genuine one, being distinct (ἀποκεκριμένη) from this, exists when the bastard form can no longer see anything smaller, or hear or smell or taste or by touch perceive other things to a finer degree (ἐπὶ λεπτότερον). (DK68 B11 = TEGP 140[F39])

To determine if this fragment really contradicts Aristotle's claim in *De Anima*, we first need to understand how Democritus explained perception.

We know from multiple sources that Democritus held that all composite objects in the world are constantly emitting fine films of atoms from their surface. He, along with Epicurus after him, called these films 'images' (εἰδῶλα).²⁷ Democritus claimed that sense perception of objects occurs when the images streaming off macro-level objects collide with our ensouled sense organs.²⁸

With this causal doctrine in mind, looking at the fragment above, we can see that the only difference that Democritus posits between sensory and intellectual perception is a difference in the *size* of the atomic shapes that affect the soul. There is no hint that the mechanism by which genuine knowledge occurs would be any different from that of sensory knowledge (i.e. causal impact by atomic films), nor even that the objects of these forms of knowledge are fundamentally different.²⁹ Thus, the most natural interpretation DK68 B11 = TEGP 140[F59] is that Democritus means to distinguish the two forms of knowledge we can have by reference to the *size of their respective atomic films*.³⁰

²⁶ The evidence of Ps.-Plutarch (DK68 A105) that Democritus believed in a separate intellectual faculty in the heart is not reliable. Lucretius' testimony (DK68 A108 = TEGP 117) is to be preferred. See Taylor (1999, 202).

²⁷ Cic. *Ad Familiares* 15.16.1 = DK68 A118.

²⁸ Aristotle is critical of this explanation of perception and argues that it wrongly reduces all forms of perception to the sense of touch. See *Sens.* 4, 442a29–b4 = DK68 A119.

²⁹ The doxography also supports the idea that the same mechanisms that produce Democritean perception also produce Democritean intellection. Stobaeus reports that, 'Leucippus and Democritus say that perceptions (αἰσθήσεις) and thoughts (νοήσεις) are alterations in the body (ἐτεροιώσεις εἶναι τοῦ σώματος)', and that, 'perception and thought occur when atomic films (εἰδῶλων) come from the outside; neither of these happens to anyone without the impact of an atomic film (χωρὶς τοῦ προσπίπτοντος εἰδῶλου)' (DK68 A30).

³⁰ This interpretation provides independent support for Frede's (2008) argument, already put forward by Weiss (1938), that Aristotle's allegation here amounts to the claim that Democritus did not have a theory of νοητά, which in Aristotle's ontology are 'true beings' ontologically distinct from the objects of perception. On the nature of the objects of thought for Aristotle, see Chapter 8, Sections 8.5–8.7.

If so, then Democritus' account of genuine knowledge is the one given by Cicero: 'genuine knowledge' occurs when an atomic image (or series of images) is small enough and fast enough to bypass the sense organs and penetrate directly to our soul atoms (DK68 A118).³¹ This suggests that there is a kind of image which is too small to affect the sense organs, but large enough to affect soul atoms directly. This idea is also strongly suggested by a number of testimonies about Democritus' affirmation of precognition,³² his account of how dream images come about,³³ and his account of our knowledge of the gods.³⁴

If such accounts are genuine, Aristotle's claim that Democritus does not make use of mind as a *separate* power concerning the truth makes sense. The reason is that the *objects* of bastard and genuine knowledge are in fact the same, namely, atomic images (of different sizes) acting upon the soul. Thus, Democritean thinking reduces to a passive alteration of the soul by atomic films that bypass the perceptual organs when they enter an animal body, and one that, moreover, can be altered depending upon the state of one's body – e.g. how hot or cold it is – just as one's sensory perceptions can be.

4.5 Democritus' Unified Explanation of Cognition and Motion

Understanding Democritus' account of sense perception and thinking as an alteration of the soul that occurs when it is impacted by atomic images also helps us to interpret another item of interest in Aristotle's doxography about him. This is a remarkable passage in which Aristotle takes the time to compliment Democritus for having provided a unified explanation of the soul's known *per se* attributes, cognition and motion. Having explained that earlier Greek psychologists defined the soul through either its cognitive capacity, its motive capacity, or both (DA 1.2, 404b27–30), and relaying that earlier thinkers tended to assign the power of causing motion to the 'primary things' (πρῶτα) (DA 1.2, 405a4–8), he continues:

But Democritus expressed his explanation (διὰ τί) of each of these attributes (τούτων ἑκάτερον) [namely, being cognitive, and being productive of motion] more subtly (γλαφυρωτέρως) than the rest: For he says that

³¹ See Taylor (1999, 203).

³² Cic. *De Divinatione* 1.3.5 = DK68 A138 = TEGP 108; DK68 B166 = TEGP 50[F14].

³³ Ps.-Plutarch, *Epitome* V.2.1 = DK68 A136; Cic. *De Divinatione* 2.67.137 = DK68 A137; *Div.* 464a5–17.

³⁴ August. *Letter* CXVIII.27–28.

the soul is identical to mind (νοῦν), that this belongs among the primary (πρώτων) indivisible bodies, and that it is productive of motion (κίνητικόν) because of its small particles (διὰ λεπτομέρειαν)³⁵ and shape; and that among the shapes the one most easily moved (εὐκίνητότατον) is the sphere (τὸ σφαίροειδές), of which sort are mind and fire. (*DA* 1.2, 405a8–13)

Although Aristotle runs Democritus' explanations of why the soul is cognitive and why it is motive together, it is helpful to separate these explanations in order to see how they fare according to the demonstrative heuristic. We can see the explanation of the soul's possession of these two *per se* attributes as presupposing three syllogisms. Democritus' first, general explanation of the soul's ability to produce motion is:

1. [A] Being productive of motion belongs_{per se} to [B] being amongst primary atoms.³⁶
2. [B] Being amongst primary atoms belongs_{per se} to [C] soul.
3. [A] Being productive of motion belongs_{per se} to [C] soul.

On its own, this might not seem impressive, but Aristotle points out that Democritus was also able to give a mathematical style explanation of the mobility and motivity of the soul atoms themselves, which we can represent in the following more specific syllogism:

1. [A] Being productive of motion and most easily moved belongs_{per se} to [B] being a collection of small spherical particles.
2. [B] Being a collection of small spherical particles belongs_{def} to [C] soul.
3. [A] Being productive of motion and most easily moved belongs_{per se} to [C] soul.

We learn from *DC* 3.8 the reasons why earlier thinkers, including Democritus, believed that being spherical contributes to being easily moved and to the production of motion.³⁷ The property of being 'most easily moved' (εὐκίνητότατα), Aristotle reports, was thought to belong to the sphere in virtue of being the least stable of shapes (ῥκίστα βεβηκέναι) and having the least number of points available for simultaneous contact

³⁵ I read λεπτομέρειαν with C here instead of μικρομέρειαν with the other MSS.

³⁶ See *DA* 1.2, 405a4–5.

³⁷ *DC* 3.8, 306b32–307a6.

by other shapes on its surface.³⁸ The former property describes the different ways a spherical object rolls around when placed on a flat surface, and the latter property is a mathematical explanation of why the sphere causes the least amount of friction.³⁹

Importantly, however, whilst these syllogisms might provide a decent explanation of the soul's ability to move the body and to be moved, the explanatory power of why the soul is able to *cognise* does not seem to be as strong. The second more specific syllogism Aristotle suggests Democritus used is:

1. [A] Being cognitive belongs_{per se} to [B] mind.
2. [B] Mind belongs_{def} to [C] soul.
3. [A] Being cognitive belongs_{per se} to [C] soul.

This hardly counts as an explanation for why the soul possesses cognition, since it merely stipulates the identity of soul and mind. However, we have seen already that Aristotle argues that, for Democritus, soul and mind are identical, because the former is the power of soul atoms to be moved by large atomic films that arrive from the world through the sense organs, whilst the latter is the power to be moved by extra-fine atomic films directly. Thus, Democritus has a good reason to think that the soul's being most easily movable (εὐκίνητότατον) provides not only the groundwork for why it can move the body around, but also, for why it is most able to undergo *cognitive* alteration.⁴⁰

We saw already from DK68 B11 = TEGP 140[F59] that Democritus holds that we have a form of genuine knowledge that only occurs when the senses cannot perceive anything of finer grain (ἐπὶ λεπτότερον). This affirmation would have allowed Democritus to put forward the claim that our soul undergoes *cognitive* motion in virtue of having soul atoms that are sensitive to being moved by the smallest of atomic images coming into the body.⁴¹

³⁸ We find evidence of the systematic Peripatetic study of the motion of spherical objects in the ps.-Aristotelian *Mechanica*. In *Mech.* 8, 851b15–852a13, Ps.-Aristotle treats the problem of why spherical and circular things (τὰ στρογγύλα καὶ περιφερῆ) are easily moved as a scientific problem in its own right.

³⁹ Aristotle also says in this context that Democritus treats the sphere as 'as a kind of angle' (ὡς γωνία τις) which, as easily moved (ὡς εὐκίνητον) cuts through other things (*DC* 3.8, 307a16–17).

⁴⁰ Pace Morel (1996, 177).

⁴¹ The connection between being 'fine-grained' and being 'subtle' (λεπτός) in thinking was also a common one in Attic speech during this time Cf. Aristoph. *Cl.* 359. Aristotle also draws a connection between being fine in grain, being easily moved, and being cognitive in *PA* 2.4, 650b18–24. I owe this point to Edward Hussey.

Taking these latter two atomist explanations together with Aristotle's praise of Democritus' subtlety, we can see that he affirms that the latter's definition of soul seems to provide a unitary explanation of both of the soul's *per se* attributes in virtue of a unified causal explanation – spherical atoms in motion – in accordance with the demonstrative heuristic. This is because his definition of soul coherently describes a unitary process in which external atomic images (i) enter into the body *via* the sense organs or non-sensory passages, and (ii) collide with the web of already-moving soul atoms in the body, and (iii) cause those atoms to move differently and to perceive. Then, in their new courses of motion, the soul atoms (iv) collide with the animal body, which then (v) causes the whole animal to move in a certain way. Thus, 'a certain collection of the spherical atoms that compose fire or heat' is able to serve as a candidate middle-term in an explanatory demonstration of both the soul's production of motion, and its production of cognition. According to the demonstrative heuristic, this means that Democritus has provided a *prima facie* good definition of soul.

4.6 Aristotle's Criticism of Democritus' Philosophy of Action

In its original context, Aristotle's criticism of Democritus' psychology follows upon his criticism of Plato's self-moving soul. As we saw earlier, in that series of criticisms, Aristotle argues that that *if* one were to identify the kind of motion that Plato ascribes to his self-moving soul with local motion (since Plato was unclear on the matter), a strange consequence follows, namely, that a soul could (in theory) leave its bodily location at will, and even resurrect dead bodies.⁴²

In contrast, Aristotle introduces Democritus as someone who *did* affirm that the soul moves locally. Unusually, however, he neglects to press the resurrection problem against Democritus. There may be a good reason why. First, a Democritean soul, as a *collection* of spherical fire atoms, is not hypothesised to be a *self-sufficient* entity like Plato's self-moving soul. Once a specific set of soul atoms leave a specific body and lose whatever coherence they once had, they do not have the power to go on to resurrect a dead body as that group of atoms (unless this happens by chance). As we have seen, there are certain bodily processes, such as respiration, that must be in place in order for soul to remain in the body in the first place. Even so, in principle, Democritus' soul atoms *could*

⁴² See Chapter 3, Section 3.6.

refill dead bodies (perhaps through artificial respiration pumps), without contradicting any atomist law of nature.⁴³

In fact, Proclus provides some evidence for thinking that Democritus, in contrast to Plato, did accept resurrection as a consequence of atomism. Proclus records that Democritus' work, *On Hades*, contained a collection of stories about people who came back from the dead.⁴⁴ Now, while it is certainly possible that Democritus made this collection for the purposes of literary history, the fact that Proclus emphasises Democritus' status as a natural scientist (ὁ φυσικός) in the report suggests that he may have written this work to show that resurrections do occur *sometimes*, and that atomism is able to explain why this is.⁴⁵ Taking these two clues together, Aristotle may neglect to press the resurrection claim against Democritus since his definition of the soul does not predict, as Plato's metaphysical definition of the soul does, the *frequent* resurrection of dead bodies.

If so, this may be why Aristotle focuses on a different problem with Democritus' ascription of local motion to soul atoms, namely, that the kind of motion which soul atoms can undergo and produce does not seem to be sufficiently explanatory of the cognitively informed motions of animals. He writes:

But some do claim that the soul moves the body in which it is in the same way as it itself is moved (ὥς αὐτὴ κινεῖται), such as Democritus, who speaks in a way that resembles Philippos the comic playwright; for he says that Daedalus made the wooden statue of Aphrodite move by pouring mercury into it – and Democritus says something similar; for he claims that, since the indivisible spheres are in motion, because of their natural state of never resting, they draw along (συνεφέλκειν) and move the whole body. But we should ask if these same things⁴⁶ produce rest; for how he will make them do so, it is difficult or even impossible to say. But generally, the soul does not appear to move the animal (ζῷον) in this manner (οὕτω), but by a certain decision (διὰ προαιρέσεώς τινος) and by thinking (νοήσεως). (*DA* I.3, 406b15–25)

Aristotle makes two interrelated criticisms here: that (i) Democritus' account of how the soul moves the body is like what Phillippos says about how Daedalus made the statue of Aphrodite move, and that

⁴³ Cf. DK68 A117 = TEGP 134; DK68 A160.

⁴⁴ DK68 B1 = TEGP 200.

⁴⁵ Against this, Thrasyllus, according to Diogenes Laertius (DK68 A33 = TEGP 7), classified this work under the ethical (ἠθικά) treatises, and not under the works on nature (φυσικά).

⁴⁶ Reading ταῦτα ταῦτα with E', instead of τοῦτ' αὐτό with the MSS.

(ii) the soul does not move the animal in the way Democritus says, but by a certain decision *and* by thinking.

We should avoid the temptation to assume that, because Philippos is a comic playwright, Aristotle's first criticism must be that Democritus' account of how the soul moves the body is risable. Aristotle's point is more subtle than this. Although Philippos' play is now lost to us, we know of at least one comedic aspect of Daedalus' moving statues which his play likely made use of.⁴⁷ In Plato's *Euthyphro* and *Meno*, we learn that Daedalus' statues, although valuable and beautiful, tend to run away unless one ties them down. In the former work, Plato compares Daedalus' incessantly moving statues to accounts or conclusions that will not stay put;⁴⁸ in the latter, he compares them to true opinions (δόξαι ἀληθεῖς) that will not stay put.⁴⁹ The *Meno* in particular suggests that basing our actions on opinions that always flee away may have worrisome implications for our continuing success.

Whilst it is not impossible that these epistemic images are evoked in Aristotle's Daedalus simile here,⁵⁰ the first similarity that he stresses is not epistemic, but kinetic. However, it is still the one that Plato lays emphasis on: not 'mechanism', but 'ceaseless motion'. Aristotle's problem is that, if one ascribes 'being in ceaseless motion' to the nature of a thing in order to explain its ability to be the motor of something else, one runs into the problem that both the motor and that which is moved will have a hard time staying put. Since Democritus appeals to such a motor to explain the body's local motions, Aristotle now questions whether this same motor will have a property that also explains how the bodies of animals are able to be in a state of rest.⁵¹

This criticism is certainly not fatal to atomist psychology. As Aristotle points out in the *Physics*, even while resting, 'there is always something within the animal's natural parts which is moving' (ἀεί τι κινούμενον ἐν τῷ ζῳῷ τῶν συμφύτων).⁵² It is not difficult to imagine that Democritus

⁴⁷ See Berryman (2003). For a fuller account of Daedalus' treatment in ancient literature and art, see Morris (1993).

⁴⁸ *Euthyph.* 10b9ff. Cf. also *Hipp. Maj.*, 828a1–3; *Alcib.* I, 121a4.

⁴⁹ *Men.* 97c9–98a4.

⁵⁰ The only other place where Aristotle mentions the moving statues of Daedalus is in *Pol.* 1.4, 1253b33–1254a1, in which passage it seems presupposed that these statues, like the tripods of Hephaestus, have the ability to perceive. Cf. *Hom. Il.* 18.376. The point of this passage is to affirm that the benefit of having all our tools perceive and be 'self-acting' (αὐτόματος) like the tripods mentioned in the *Illiad*, is that they would *lack* the rational power to *do otherwise* than what they were made for. Cf. Menn (2002, 112, n. 43).

⁵¹ Cf. *Top.* 4.6, 127b15–16.

⁵² *Phys.* 8.2, 253a11–13.

held that other factors at play in an animal's body, such as its heavier or larger atoms, might be sufficient to hinder the transfer of the soul's motion to the limbs of the animal. For instance, eating food might fill up atomic pores in the body in a way that would make it difficult to move the whole animal. However, criticism (ii), it will turn out, is more difficult to answer.

Contemporary scholarship, like the ancient commentators,⁵³ has tended to take Aristotle's second criticism at face value: the charge, it is said, is that Democritus' definition of soul as a collection of spherical atoms mechanically pushing around the body leaves out the self-evident role of cognition and decision in the production of action.⁵⁴ Whilst this is a perfectly natural way of interpreting Aristotle's criticism, it cannot be wholly right.

First, if this were all there is to the charge, we would have to interpret Aristotle as alleging that there is a fundamental gap between Democritus' account of the soul's cognitive powers and his account of the soul's motive powers. However, we have already seen that Aristotle goes out of his way to compliment Democritus for having a theory that provides a unified *prima facie* explanation of both of these *per se* attributes. It would be bizarre to think that Aristotle had somehow forgotten that, within the previous chapter, he reported that Democritus identified the atoms that compose soul with the atoms that compose mind, and that everything that appears to this motive and *thinking* soul (*via* its reception of atomic films) is true.

Second, Aristotle's own account of how the soul moves the body is also, at a certain level of description, just as mechanistic as that of Democritus. In *De Motu Animalium*, Aristotle goes to great lengths to argue that the perceptive part of the soul is able to bring about the local motion of animals in virtue of its causal connection to the physical expansion and contraction of connate *pneuma* around the heart.⁵⁵ This expansion or contraction, he argues, causes a chain reaction in the parts of the body that are contiguous to the *pneuma*, which ultimately causes the motion of animals.⁵⁶ Although this *pneuma* does not 'drag the body around' like Democritus' soul atoms, Aristotle is insistent that it operates by the same basic mechanisms as they

⁵³ Philoponus (*In de anima*, 114.15), the most prolix of the ancient of commentators, quips only that it is 'a most powerful refutation' (Καρτερώτατος ἔλεγχος).

⁵⁴ E.g. Witt (1992, 176); Rechenauer (2009).

⁵⁵ *MA* 10, 703a19–703b2.

⁵⁶ *MA* 9, 702b20–4.

presumably do, namely, pushing (ῥωσις) and pulling (ἐλξις),⁵⁷ in virtue of changes in the connate *pneuma*. Thus, if Aristotle thinks that Democritus' explanation of how the soul moves the body fails, it cannot be because he thinks the soul moves the body *non-mechanistically*. It is also clear that Aristotle does not think that Democritus' explanation fails *just because* it appeals to the wrong mechanical explanation of how the soul moves the body.

We can make more progress in understanding Aristotle's second criticism by noting that the contrast made in the simile is *not* between (1) the mechanism of dragging,⁵⁸ and (2) some sort of decision *or* thinking. Rather, the contrast is between (1*) the Democritean cause picked out by διὰ, 'being by nature never able to rest', and (2*) some sort of decision *and* thinking. The traditional interpretation, which sees Aristotle as contrasting a bare mechanistic account with a cognitive one, has him not only attacking a straw man, but has him attacking it in a stupid way – namely, immediately after claiming that Democritus ascribes to his spherical soul atoms *both* thinking *and* motivity. On the traditional interpretation, it is completely unclear why 'being by nature never able to rest' comes into conflict at all with either moving by a sort of decision or with thinking. This is because Democritus could simply counter that, according to his psychology, some instances of the soul's undergoing a change of motion in the body just *is* a mechanistically determined decision or act of thinking.

Against this interpretation, we should note that Aristotle's claim that the soul moves animals by 'a certain decision and thinking', is ambiguous. Whilst it is possible to read 'thinking' as exegetical for 'a certain decision', it makes more sense to read Aristotle as making a jab here at Democritus' account of thought by mentioning a feature common to human actions that it cannot explain, namely, that a decision (προαίρεσις) often happens before (or at the time of) an action.⁵⁹ His criticism is, whilst Democritus' psychology can explain how (atomistic) thought moves the body – because thinking just is the collection of moving soul/mind atoms being impacted by atomistic films which can move the body – it cannot explain how the soul sometimes intentionally decides to move the body in one way rather than another, or intentionally decides to rest. In short, Democritus cannot account for intentional actions.

⁵⁷ *MA* 10, 703a19–20. Cf. *DA* 3.10, 433b25–6.

⁵⁸ Cf. *Phys.* 7.2, 244a7–11.

⁵⁹ Although Aristotle uses the term 'animal', he clearly has humans in mind. This is the only time that Aristotle uses the term προαίρεσις in *De Anima*. Cf. *DA* 3.10, 433a11–12; *DA* 3.10, 433a21; *MA* 6, 700b17–24.

4.7 The Results of Aristotle's Criticism of Democritus

Aristotle's criticisms of Democritus, as with Plato, place both positive and negative constraints on his own account of soul. Negatively, Aristotle's criticism of Democritus constrains him to deny that a reductive materialist account how the soul moves the body is possible, since a description of how the soul moves the body on any given occasion will have to contain an intentional description under which the action is done in order to be complete. This constraint, I have suggested, Democritus can accept, in virtue of identifying soul with mind. However, positively, Aristotle's criticism places on him the constraint of needing to show *how* the soul can make the body move (and rest) in an ordered way, rather than making it move all the time in virtue of its ceaseless atomic motions. This, I claim, Aristotle does by pointing out that psychologically produced motion occurs in virtue of *a certain decision* – which I shall argue below should be understood as a *free* decision.

These constraints become apparent in *DA* 3. They are best understood, I claim, as having developed in response to his criticisms of Democritus' psychology. First, in respect of the motion of non-human animals, Aristotle argues that the most basic cause of an animal's being moved to pursue or avoid certain things is its intentional desires, in conjunction with its power of sensory imagination (φαντασία).⁶⁰

Although in practice Democritus can allow that psychological events can be given such conventional descriptions, he cannot accept that psychological events are *basic* in explanations of what really causes an animal to move. Indeed, he would insist that any such psychological descriptions (if true) would necessarily have a 'real' atomistic description, set out by atomistic laws of motion, which provides the true necessary and sufficient causes of the motion in question.

Although this reductive atomistic position is certainly defensible, we can see why Aristotle would be dubious of its cogency. The first problem with it is that, according to his demonstrative heuristic, it fails to explain *which* atomistic interactions are nomologically linked to *which* perceptual events and actions.⁶¹ For instance, assume that the intentional action of a person *X*, 'eating an apple', is truly described as consisting of a series of intentional sub-actions, such as 'reaching for the apple', 'grasping the apple', 'biting the apple', 'chewing the apple', and

⁶⁰ *DA* 3.10, 433a12.

⁶¹ Cf. Davidson (2001, 207–25).

‘swallowing the apple’. Now try, in accordance with the demonstrative heuristic, to form a guess as to which atomic films emitted from an apple through the sensory organs of *X* into *X*’s soul would explain why *X*’s body, upon their soul receiving such atomic films, engaged in the sub-actions referred to above.

For one, there is the problem that this complex action has to be performed *in a particular order*, despite the fact that the same atomic films would be constantly streaming into *X*’s visual organs. For another, it does not seem that the films of an apple, as opposed to the films of an approaching bear, have a more geometrically intelligible explanatory connection to the first sub-act of ‘reaching for’ than to a first sub-act of ‘fleeing from’. However, if knowledge of the geometrical and motive properties of the films emitted from an apple does *not* provide a plausible guess as to how the soul produces *X*’s ‘eating an apple’, then Democritus’ theory fails the demonstrative heuristic.

There is also a second feature of Democritus’ account of how the soul moves the body that places a positive constraint on what Aristotle’s own account of soul will need to affirm. This is that Democritus’ theory of how the soul moves the body strongly suggest that soul, in virtue of its parts being subject to ceaseless motion, could not act from a stable rational capacity. Democritus’ soul atoms, *ex hypothesi*, are always changing from one state to another due to external and internal influences. This implies, among other things, that no mental event that leads to a human action is ever really ‘up to us’, in the sense that we are free to choose one action rather than another one. However, in *DA* 3.3, Aristotle suggests that our cognitive capacity for decision-making does rest upon a basic psychological action that is up to us, and that there is a causal nexus between external physical influences and the psychological production of animal motion wherein chains of causation can be redirected by the choices of rational animals.

When Aristotle comes to contrast the central differences between sense perception and thinking – capacities which Democritus conflated – he is emphatic that one of the two differences between them is that, for human animals, thinking (νοῆσαι) is ‘up to someone whenever they wish’ (ἐπ’ αὐτῶ, ὅπότεν βούληται).⁶² There is no suggestion that this claim comes with caveats. Aristotle does not claim, for instance, that ‘wishing to think’ only occurs if there is an external impulse that stirs up

⁶² *DA* 2.5, 417b18–26.

one's wish to think. Such a deterministic picture, I think, fits uneasily within Aristotle's theory of practical action. If we instead take Aristotle at his word, and he clearly believes that freedom to think is involved in decisions or intentional acts to move our bodies or not, then it follows that the movements and resting states of our body (at least under normal conditions) are also up to us.

This suggestion is also confirmed in *DA* 3.7, where Aristotle writes that mind thinks its proper objects, intelligible forms, by using images (φαντάσματα). These are the very same images that he claims to be 'up to us' to call to mind and contemplate. Here the contrast between Aristotle's theory and Democritus' becomes apparent. Unlike Democritus' psychology, in which atomic images originating from the external world *immediately* move our soul atoms to press against and move an animal body in whatever way the physical laws of motion require, Aristotle's theory allows that the thinking soul has the ability to stop and deliberate about its images and goals. This allows the thinking part of the soul time to calculate about what decision to take in the future.

Aristotle further implies that outcome of this decision is *not* predetermined by the prior state of the world and the laws of motion, as it seems to be on Democritus' account. He writes:

So it is the forms (εἶδη) within the mental images (φαντάσμασι) which the capacity for thinking (τὸ νοητικόν) thinks. And, as within those things the objects of pursuit and avoidance have been defined for it, even outside perception, when engaged with images, it is moved ... But at other times, when there are images or thoughts in the soul, as if it were seeing them, it calculates (λογίζεται) and deliberates (βουλευέται) about the future in respect of the present. (*DA* 3.7, 431b2–10)

This form of imagination, Aristotle claims, just *is* the power to act in 'this way or that' (τόδε ἢ τόδε).⁶³ This is a feature of thinking for which Democritus cannot account.

Relatedly, Aristotle also thinks that, *contra* Democritus, our mind has a form of stability that could not be accounted for if it were able to be moved (e.g. by externally arriving atoms). In *DA* 3.11, when Aristotle spells out what the activity of rational calculation looks like, he argues that our

⁶³ *DA* 3.11, 434a7–8.

mind's capacity for knowledge from which our calculations follow must 'be at rest', as it were, in order to perform its function. He writes:

But the capacity for knowing (ἐπιστημονικόν) is not moved (οὐ κινεῖται), but is stable (μένει). But since one [premise] is the universal supposition and the account, but the other [premise] is of the particular (for the former says that it is necessary that this sort of person do this sort of thing, but the latter that this is such a sort, and that I am such a person), either indeed the belief (δόξα) itself causes motion, not the universal, or both do, but the one instead being at rest (ἡρεμοῦσα), and the other not. (*DA* 3.11, 434a16–21)

In this picture of the practical calculation process, Aristotle decomposes the mental conditions of a decision – which he earlier claimed against Democritus to be that by which the soul moves the body *in addition to* (a Democritean form of) perception/thinking – into a so-called practical syllogism. This mentally grasped syllogism has a universal item of thought (its 'major premise') and a perceptual belief (its 'minor premise').

Here, Aristotle suggests that some actions may have two causes that are jointly necessary and sufficient for their production. One of these conditions Democritus can affirm (albeit by different causal mechanisms): the condition that a particular perceptual belief can cause an animal to move. However, on Aristotle's more considered picture, this will not suffice for all cases of action. In some cases, a universal, which is grasped by an intellectual power *at rest*, plays a causal role in the production of action as well. Since Democritus believed that soul atoms are *always* moving and subject to impact from other atomic films, they are unable to play this dual causal and cognitive role.

It might be objected that, although it is true that Democritus affirms that acts of perception are unstable and vary with the psychological states and environments of different perceivers, this is not the case with epistemic states, since he implies that we have access to relatively stable non-relative epistemic truths (e.g. that only atoms and the void exist). This suggests that he may have thought that the minute atomic films that constitute the contents of genuine knowledge were more stable entities than the films that constitute the contents of perception.

If he were a supervenience theorist, for instance, he could claim that epistemic states (unlike perceptual states) supervene upon a *range* of soul-states that include different motions and different atomic configurations. If so, he would only be committed to the idea that if an epistemic state *M* in an animal changes to an epistemic state *N*, then some change has taken place in the set of soul-atoms *S* upon which these epistemic states supervene. However, he would be free to claim that there could be many, or

even an infinite range of *S*-states ($S_1, S_2 \dots S_n$) upon which *M* supervenes. As long as the soul was in one of those *S*-states, *M* would be epistemically stable and appear to a knower to be 'at rest' in the same way as an Aristotelian universal premise. If so, Democritus could (in principle) consistently hold that soul atoms are constantly moving (and thus in different configurations) and also that such a soul could still be in (relatively) stable supervening epistemic states.

Although this explanation is coherent, it is one that Democritus could not have affirmed. This is because it makes knowledge the product of an emergent property that belongs to the soul alone, without reference to the atomic films that must be in contact with the soul in order for perception or knowledge to occur. Just as the perception of an apple, for Democritus, requires an actual atomic film to be emitted from an apple which is the literal perceptual content received by the soul, so also the *knowledge* of an apple (e.g. that it is a round tree-fruit) requires atomic films residing in the soul.

Thus, Aristotle has two real problems with Democritus, which constrain the form that his own theory of psychologically produced motion takes. It does not offer an intelligible explanation of intentional action, and it rules out *ab initio* that we have a power to think whenever we wish and to calculate about actions that are 'up to us'. On Democritus' deterministic account of action, however, no matter sophisticated it becomes, we *do* turn out to be Daedalian *automata* whose opinions and actions are completely causally determined by prior states of the universe in conjunction with the laws of motion that soul atoms follow.⁶⁴

In alleging that the production of human motion at least seems to be *caused* in a different manner from this (namely, by a form of intentional thinking that is up to us), Aristotle commits himself to two further ideas that will shape his theory of soul. First, the soul's power to produce motion will need to be goal-directed, and second, that this power involves a stable form of epistemic control to do, or refrain from, a particular course of

⁶⁴ Cf. Balme (1941, 27). For a more sanguine assessment, cf. Johnson (2009, 2014). Epicurus provides indirect evidence that the latter difficulty in particular is a real one for Democritus. We have reason to believe that the Epicurus' most radical modification to ancient atomist theory – the introduction of swerving atoms to account for free decision – was introduced in part to avoid the implications of psychological determinism which he found present in Democritus. Cf. Epicur. (*Ep. ad Men.* 134) = LS 20A; Epicur. (*Nat.* 34.21–22); (*Nat.* 34.26–30) = LS 20B, 20C. Cf. also Diogenes of Oenoanda 32.1.14–3.14 = LS 20G. Cf. Bailey (1928, 319–23); Edmunds (1972); Furley (1967); Sedley (1983); Englert (1987); O'Keefe (2005). If the above analysis is right, it is likely that it was Aristotle's comparison of Democritus' ensouled animals to Daedalus' moving statues that first drew Epicurus' attention to this problem. Cf. Huby (1967); Hardie (1968).

action. Together, these features not only amount to something like an inchoate conception of free will;⁶⁵ they also provide reasons for thinking that the kind of efficient-cause that the soul is, as the *Efficient-Final Causal Thesis* will claim, is one which produces motion for a specific end. It also implies that the production of this psychological motion will occur in virtue of an epistemic control that is free from material influence, in conformity with the *Separability Thesis*. That Democritus' physics cannot, by the demonstrative heuristic, account for this form of intentionally produced and epistemically informed motion – in part because it cannot account for stable forms of cognition and free acts of thinking – is Aristotle's problem with his psychology.

⁶⁵ Cf. Frede and Long (2011) and Bobzien (1998, 2000), none of whom take into account the Daedalus passage.

Xenocrates' Psychology

But the celebrated characteristics of numbers and their opposites, and generally the mathematical relations, if we view them as some do, making them causes of nature, seem to escape us; for none of them is a cause in any of the senses that have been distinguished in reference to the first principles. (Trans. Ross)

Aristotle, *Metaphysics* M.6, 1093b7–11

5.1 Introduction

In his inquiry into earlier theories of the soul, Aristotle discusses two Academic theories that align its nature with the nature of mathematical forms. The first is a *geometrical* theory of the soul hypothesised by Plato in his *Timaeus*, and the second, an *arithmetical* theory which defines soul as a ‘number moving itself’ (ἀριθμὸν κινουῦνθ’ ἑαυτόν) (*DA* 1.2, 404b29–30). The doxographical tradition unanimously ascribes this latter definition of soul to Xenocrates of Chalcedon (ca. 339/8–314/3 BCE).¹

I first give an overview of Aristotle’s account of Xenocrates’ theory of soul (Section 5.2). I then discuss the dialectical and logical problems that Aristotle raises for this definition in the *Topics* and the *Posterior Analytics* (Section 5.3). I go on to argue that Aristotle’s criticisms of Xenocrates’ theory in *De Anima* – whilst drawing upon these dialectical criticisms – are more substantial than the ones offered in those works (Sections 5.4–5.10). I conclude by arguing that Aristotle’s criticisms of Xenocrates’ psychology provide a strong negative constraint on his developing hylomorphic psychology, namely, that soul cannot be a mathematical form (Section 5.11).

¹ Our best evidence for this comes from Plut. (*De animae procreatione in Timaeo* 1, 112d). Cf. Philop. *In de anima* 32.33; Philop. *In de anima* 44.1; Aët. 4.2.4.

5.2 Aristotle's Account of Xenocrates' Theory of Soul in *De Anima*

Aristotle's analysis of Xenocrates' theory of soul begins in *DA* 1.2. After reporting that Plato in the *Timaeus* made the soul out of 'elements' (by which Aristotle seems to mean the mixture of divisible and indivisible forms of Sameness, Difference, and Being with which the Demiurge forged the world soul), he claims that a similar doctrine was laid down 'in the things said within *On Philosophy*' (ἐν τοῖς Περὶ φιλοσοφίας λεγομένοις), a lost dialogue by Aristotle, in which other Academic theories and thinkers were criticised.² He writes:

In a similar manner [to what Plato said in the *Timaeus*], in the things said in *On Philosophy*, it was laid down (διωρίσθη) that the Living Being itself (αὐτὸ μὲν τὸ ζῶον) was made from the Idea of the One (ἐνὸς ἰδέας) and the primary length and breadth and depth, and the others similarly; but still in another way, that mind (νοῦν) is the One, knowledge (ἐπιστήμην) is the Two (for it proceeds in a single way towards unity), and the number (ἀριθμὸν) of the plane is opinion (δόξαν), and perception is the number of the solid. But numbers (ἀριθμοὶ) were said to be the Forms themselves (τὰ εἶδη αὐτὰ) and principles (ἀρχαί), but numbers come from the elements (ἐκ τῶν στοιχείων), and some things are judged by mind, some by knowledge, some by opinion, some by perception. But these numbers are the forms (εἶδη) of things. But since the soul was believed to be both productive of motion and cognitive in the way described above (οὕτως), some (ἐνίοι) wove it from both, and affirmed that the soul is a number moving itself (ἀριθμὸν κινουῦνθ' ἑαυτόν). (*DA* 1.2, 404b19–30)

Although this passage has often been taken to refer to Plato's unwritten doctrines, the testimony of Themistius, as well as Aristotle's discussion of Academic theories of substance, Forms, and numbers in the *Metaphysics*, makes it more likely that it belongs to Xenocrates. In the latter work, we learn of a member of the Academy who differed from Plato and Speusippus in respect of their beliefs about these three kinds of beings. This Academic, like Plato, held that Forms exist as substances separate

² Philop. (*In de anima*, 75.34–76) and Simpl. (*In de Anima*, 28.7–9) assume that this refers to Aristotle's *On the Good* (περὶ τἀγαθοῦ), which summarised the unwritten doctrines of Plato, perhaps being influenced by Alexander's reports about its doctrines (cf. Alex. *In Arist. Metaph.* 55.20–56.35). However, Themist. (*Paraphrasis in de Anima*, 11.37–12.1; 31.33–5; 32.19–33), who claims to have first-hand knowledge of Xenocrates' *On Nature* (περὶ φύσεως), claims that the doctrines Aristotle is describing belong to him. I take it that he is correct. See Cherniss (1944, 565–80) and Pines (1961, 14–18).

from the particular things whose nature they explain. Call this doctrine *Simple Platonism*. Second, and more strangely, he held that each Form is identical to a number, and that every number is generated from the 'One' and another cosmogonical material principle, the indefinite dyad.³ Call this doctrine *Mathematical Platonism*.

Plato, of course, accepts *Simple Platonism*. However, according to Aristotle, he did not subscribe to *Mathematical Platonism*. This is because Plato seems to have believed that Forms and numbers play distinct explanatory roles in virtue of being distinct kinds of substances.⁴ Speusippus, in contrast, rejected *Simple Platonism* and thus also *Mathematical Platonism*. Although he held that mathematical objects exist – since they are the objects grasped by mathematicians in thought, and to which the theorems of mathematics refer – he rejected the existence of Platonic Forms.⁵ Given this, Xenocrates comes out as the only Academic we know of who would advocate both *Simple Platonism* and *Mathematical Platonism* (perhaps out of a desire to harmonise the beliefs of Plato and Speusippus). Since the description of the soul's creation in 'another way' rests upon both of these Platonisms, Xenocrates is its likely advocate.⁶

Xenocrates affirmed, in agreement with Plato's later ontology, that there exists an eternal material principle, modelled after the 'receptacle' of *Timaeus* 50d, which was called by later Academics the 'indefinite dyad',⁷ or the 'great and small'.⁸ He also believed that an eternal formal principle – the 'One' – acted upon that material principle; and third, that after the One 'acted' (presumably, in a non-temporal sense) upon the indefinite dyad, it generated the Form-numbers – Two, Three, Four, etc.

This three-step process, apparently, is what Aristotle refers to in saying that the numbers were themselves composed 'from the elements' (ἐκ τῶν στοιχείων) – here, the One and the indefinite dyad. The causal or

³ *Metaph.* Z.2, 1028b24–7; *Metaph.* M.7, 1080b22–3; *Metaph.* M.8, 1083b1–8; *Metaph.* M.9, 1086a5–11. Cf. Annas (1976, 163–4).

⁴ *Metaph.* Z.2, 1028b19–21.

⁵ *Metaph.* N.2, 1090a2–15; *Metaph.* N.3, 1090b14–20.

⁶ Other internal evidence points to him as well. For instance, Aristotle claims in the *Metaphysics* that Xenocrates' number theory is 'worse' (χείριστα) than other Academic number theories (*Metaph.* M.8, 1083b1), just as he claims in *De Anima* that Xenocrates' definition of soul as a self-moving number is the most unreasonable (ἀλογώτατον) of the definitions offered by earlier thinkers (*DA* 1.4, 408b32). He also claims in *Metaph.* M.8, 1083b6–8 that Xenocrates' theory suffers from the defects of another theory (that of Form-numbers), as well as its own particular ones, just as he claims in the *De Anima* that the self-moving number theory suffers the defects of self-moving soul theories, as well as its own difficulties.

⁷ *Metaph.* N.2, 1088b28–35; *Metaph.* N.2, 1089a35–b2.

⁸ Cf. Aët. 1.7.30 = Diels 304B; Dillon (1985), (1986), (2003, 90ff).

explanatory role that Xenocrates' Form-numbers play in relation to producing further particular objects, however, is unclear. He seems to have held that the Form-numbers acted upon certain species still latent within the indefinite material principle at a 'lower level', as it were, to actualise them.⁹ Once actualised, parts of the material principle may have been thought to have become lines, other parts planes, etc. These geometrical objects, presumably, in turn combined to form other entities, perhaps in a way analogous to the *Timaeus*' depiction of the formation of the so-called elements out of basic triangles.

For our purposes, the important point is that Xenocrates seems to have identified Form-numbers with the definitional or explanatory essences of all 'lower' beings.¹⁰ His Form-numbers are supposed to explain the unity, variety, and essential form of all the beings in the cosmos other than the One and the indefinite dyad itself. For example, according to the *Metaphysics*, the Form-number Two was identified as the essence of line, in virtue of it shaping some part of the material principle to make it extend in just two directions, and the Form-number Three was identified as the essence of plane figure, for similar reasons.¹¹

In *DA* 1.2, Aristotle informs us that some members of the Academy held that the Form-numbers were, in addition to being the explanatory essences of *geometrical* objects, also the essences of the soul's capacities. The justification for this, Aristotle claims, was epistemological: if all beings in the cosmos derive their essence from Form-numbers, then, given the principle that like cognises like, in order for soul to know these beings, it must also share in, or be composed of, those Form-numbers.¹²

To establish a link between the soul's capacities and Form-numbers, Xenocrates apparently argued that the soul's essential powers – mind, knowledge, opinion, and perception – can be explained in some manner by the Form-numbers One, Two, Three, and Four. This suggests (but does not entail) that Xenocrates viewed the essence of human soul as in some way a compound of these Form-numbers (i.e. of One, Two, Three, and Four), such that its substantial form, as a whole, may have been affirmed to be identical to the Form-number Ten.

⁹ *Metaph.* A.9, 992a10–19; *Metaph.* M.9, 1085a7–23.

¹⁰ However, cf. *Sext.* (*Adv. Math.* 7.147–8).

¹¹ *Metaph.* N.3, 1090b21–4. Presumably, we should not identify these 'material' planes and figures with perceptible things, but with items grasped in thought or imagination. Here, however, Aristotle admits that he is not sure what the status of these composite geometrical objects is.

¹² Cf. Polansky (2007, 118).

Unfortunately, even if correct, this picture does not explain why Xenocrates thought that 'self-motion' needed to be added to the definition of soul as a number. Even Plutarch of Chaeronea's report that Xenocrates used the ingredients of Sameness and Otherness in the *Timaeus* story as *explanantia* of, respectively, the soul's powers to cause rest and motion, provides no help.¹³ Since Xenocrates affirmed *Mathematical Platonism*, he must have thought either that 'Sameness' and 'Otherness' were themselves Form-numbers (e.g. Five, or Six), which is *prima facie* doubtful, or, that they were characteristics of the indefinite dyad, which is speculative. If the latter *were* the case, he may have viewed particular souls as composed of portions of the indefinite dyad's *material* 'sameness' and 'otherness' actualised by the Form-number Ten, a doctrine linked to the Pythagorean doctrine of the *tetractys*.¹⁴

This latter, and admittedly speculative reconstruction, is perhaps the most sense we can make of the murky Academic Form-number theory described in *DA* 1.2. In any case, Aristotle has no less of a difficulty making sense of Xenocrates' definition of the soul. It is perhaps for this reason that he decides not to focus on the cognitive aspects of the Xenocratean theory he lays out in *DA* 1.2, but rather on whether a Form-number definition of soul is coherent enough to explain, in accordance with the demonstrative heuristic, how soul produces motion in the body.

5.3 Xenocrates' Theory of Soul in the *Topics* and *Posterior Analytics*

Before turning to Aristotle's criticisms of Xenocrates' definition of soul in *De Anima*, it will be helpful to see what Aristotle's criticisms of this theory of soul look like in more dialectical contexts. Aristotle criticises Xenocrates' definition of soul as a 'number itself moving itself' in the *Topics* four times. In *Top.* 3.6, he claims that if soul is to be predicated with number *per accidens*, then it must *per accidens* fall under some particular species of number, such as odd or even. If soul is neither odd nor even, he says, then it cannot be a number even *per accidens*.¹⁵

Aristotle raises a similar criticism in *Top.* 4.2. Treating odd and even as differentiae of number rather than species of it, he claims that, since

¹³ Cf. Xenocrates (Heinze, Fr. 65); (Heinze, Fr. 66); Cherniss (1944, 511).

¹⁴ Aët. 1.7.30 = Xenocrates (Heinze, Fr. 15) can be read as providing support for this view, insofar as it links the world soul to the dyadic principle.

¹⁵ *Top.* 3.6, 120b3–6.

neither odd nor even is a differentia of soul, the soul cannot fall under the genus of number.¹⁶ Similarly, in *Top.* 4.3, he claims that, since every species of soul is something that has ‘a share in life’ (ζωῆς κοινωνεῖ), but no species within the genus of number has a share in life, soul cannot be number.¹⁷

A final mention of Xenocrates’ definition of soul occurs in *Topics* 6.3. There, Aristotle argues that the definition of soul as a ‘number itself moving itself’ (ἀριθμὸς αὐτὸς αὐτὸν κινῶν) – which specifies Plato’s ‘that which moves itself’ (τὸ αὐτὸ αὐτὸ κινουῦν)¹⁸ as being in the genus of number – is uninformative, since Plato’s definition seems to capture the soul’s essence without the extra determination of being a number.¹⁹

Importantly, in none of the aforementioned criticisms does Aristotle claim that Xenocrates’ definition of soul is false. Instead, each serves merely as an example of how to attack a proposed definition or predication claim in accordance with the rules of formal dialectic. The point of all four criticisms is merely that the definition of soul as a ‘self-moving number’ might, in a dialectical debate, be thought to generate a mismatch between common semantic intuitions about ‘number’ and ‘soul’, in relation to dialectical questions about the genera, species, accidents, differentiae, and nominal definitions of these two items.

However, Aristotle also criticises Xenocrates’ definition of the soul in the more scientific context of the *Posterior Analytics*. In this text, he discusses a proof, likely offered by Xenocrates, intended to formally *demonstrate* that the definition of soul is ‘number moving itself’. He suggests that Xenocrates’ proof ran as follow:

1. [A] Self-moving number belongs_{def} to [B] what is explanatory of its own life.
2. [B] What is explanatory of its own life belongs_{def} to [C] soul.
3. [A] Self-moving number belongs_{def} to [C] soul.²⁰

Although this syllogism is valid, Aristotle claims that it does not demonstrate the definition of soul. This is because, as we saw in Chapter 1, a proper demonstration should reveal how a middle-term *M* is explanatory of the fact that some *P* belongs to *S* (e.g. by showing that *M*’s connection

¹⁶ *Top.* 4.2, 123a13–14.

¹⁷ *Top.* 4.3, 123a25–6.

¹⁸ E.g. *Phaedr.* 245e.

¹⁹ *Top.* 6.3, 140b2–6.

²⁰ *APo* 2.4, 91a35–b1. For a detailed discussion of this passage, and Xenocrates’ possible response to Aristotle, see Charles (2005, 185–92).

to both P and S is more intelligible, better known, etc., than P's connection to S).²¹ The syllogism on offer here assumes that the first premise is more intelligible than (or as intelligible as) the conclusion. However, this cannot be the case, unless it is more intelligible to predicate 'explanatory of its own being alive' of 'number itself moving itself' than to predicate it of 'soul'. However, it is not.

Aristotle's allegation then is that Xenocrates has committed both a logical and a scientific error: he has committed the *logical* error of trying to demonstrate the *definition* of soul in the conclusion of a syllogism; and he has committed the *scientific* error of not showing which properties of number are explanatory of life. This passage shows that, already in the *Posterior Analytics*, Aristotle is concerned that Xenocrates' definition of soul will not be properly explanatory of the soul's nature or *per se* attributes.

5.4 The Problem of Monadic Motion

Aristotle begins his criticism of Xenocrates' definition of soul in *DA* 1.4. He writes:

Among all the things said [concerning the soul], the account that says that it is a number moving itself (ἀριθμὸν εἶναι τὴν ψυχὴν κινουῦνθ' ἑαυτόν) is by far the most unreasonable; for firstly, to the holders of this theory belong the impossibilities that follow from claiming that the soul is moved, and secondly the particular impossibilities [that follow] from the claim that it is number. For how could one think (νοῆσαι) of the monad (μονάδα) as moved (κινουμένην), and by what, and how – a monad being without parts (ἄμερῃ) and without difference (ἁδιόφορον)? For insofar as something is able to cause motion and be moved, then it must have some difference in itself (διαφέρειν δεῖ). (*DA* 1.4, 408b32–409a3)

Importantly, Aristotle's does not begin to interrogate Xenocrates' definition of the soul by using any of the aforementioned dialectical *topoi*. Instead, he seems to be worried about this definition's violation of a principle established in his *Physics*, namely, that partless things cannot be in motion.²²

²¹ I take it that this is what Aristotle means by saying that the 'deduction' that soul is a self-moving number works through 'conversion' (ἀντιστρέφειν). In effect, Xenocrates assumes at the start that the soul is, as it were, the same entity (ὡς τὸ αὐτὸ ὄν) as a number that moves itself, because he assumes without justification that both self-moving number and soul are defined by the middle term, 'explanatory of its own life' (*APo* 2.4, 91b1). I thank Simona Aimar and Christian Pfeiffer for discussing this passage with me.

²² *Phys.* 6.10, 240b8–15.

Further, his queries about the nature of monads do not appeal to common semantic intuitions about the relationship between monads and numbers, but to Academic number theory.

In the *Metaphysics*, Aristotle reports that all Academic number theories assumed the following principles:

- (P1) Numbers exist apart from perceptible things.²³
- (P2) Numbers are composed of intelligible units or monads.²⁴
- (P3) Monads are indivisible or 'partless' (ἀμερῆ).²⁵
- (P4) The monads that compose specific numbers are without qualitative difference.²⁶

Xenocrates' number theory can thus be characterised by the equation: Form-number = homogeneous collection of separate, intelligible, indivisible monads.²⁷ Aristotle here calls into question the coherence of affirming that the monads that are the soul's Form-number could be predicated with motion. There are a number of different problems involved in trying to conceive of this possibility.

First, to claim that any monad in a Form-number moves is in tension with the Platonic claim that mathematical objects are essentially unmoving.²⁸ Assume, for example, that the Form-number Two exists, and all mathematical equations using the symbol '2' refer to *it*. What could it mean to say that this *Two*, which is a formal unity constituted by two abstract and partless monads, moves itself?

One possibility is that one of the monads, or both monads together, are travelling from one Aristotelian place to another. But if so, what consequences would this have for the stable character of equations such as $2 + 3$? Would it be that sometimes $2 + 3 = 5$, but other times, $2 + 3 = 3$, because the Two accessed by our thought might *move away* from the Three? Or, would it be that the number Two is simply inaccessible to thought when it is in

²³ *Metaph.* M.6, 1080b13–16; *Metaph.* M.6, 1080b30–1.

²⁴ *Metaph.* N.6, 1080b30–2. Cf. Annas (1976, 21).

²⁵ *Metaph.* M.7, 1082b31–2. Cf. Plut. (*De animae procreatione in Timaeo* 2, 1012e1ff). If a monad were *not* indivisible, any given abstract number could potentially be more or less than it is essentially.

²⁶ *Metaph.* M.7, 1081b35–37. Even so, Xenocrates theory of Form-numbers commits him to the belief that each individual Form-number (e.g. Two, Three) is composed of monads which, despite having no qualitative differences *internally*, are different and non-comparable *externally* (like apples and oranges) to the monads which compose *other* Form-numbers. Cf. *Metaph.* M.8, 1084b21–2.

²⁷ Cf. Cherniss (1944, 399).

²⁸ *Metaph.* Λ.1, 1069a30–1069b1; *Top.* 2.7, 113a29–30. Cf. Owen (1968b, 110).

motion? Or, could our minds always 'track' Form-numbers, like birds, no matter where they were, or how fast they moved? Aristotle, for obvious reasons, does not focus on these problems. Instead, he begins with a more fundamental question: how can we *conceive* of a monad in motion, given that, *ex hypothesi*, a monad is partless and without internal differences? In asking this question, Aristotle is invoking the imaginative component of his demonstrative heuristic.

Aristotle's proof that we cannot conceive of partless entities to be in motion *per se* is given in the *Physics*. It runs as follows: if something is in motion, then it must be in motion from some initial state *A* to some goal state *B* during some extended time *t*. During *t*, the object must necessarily have some part that is no longer in *A* (otherwise it would be at rest), and some part which is not yet in *B* (otherwise it would have finished the motion). Now, if an object which has no parts (e.g. a mathematical point) were in *A*, and one wanted it to move to *B*, the moving mathematical point – whilst in motion – would have to have a *part* which was *no longer* in *A*, and a *part* which was *not yet* in *B*. However, since there is nothing *smaller* than a point by which it is conceivable to divide the point (and further, a point is *ex hypothesi* indivisible), the point cannot be conceived to be *in* motion.

However, there is another option. Xenocrates may have thought of soul as a self-moving number in terms of Platonic participation or imitation. If so, then the idea would be that soul, as something self-moving, might have its essence identified with a Form-number (e.g. Ideal-Ten) which its dyadic material imitated to some degree or another. However, the downside of this solution is that it leaves unexplained where the soul's property of being *self-moving* comes from (unless from the indefinite dyad), given that the essence of soul should be identical to the Form-number it imitates. Aristotle thus implies that Xenocrates has to make a choice: *either* modify his non-motive account of Form-numbers, or drop his Form-number account of soul. The essence of soul, in other words, cannot be conceived of as including both motion and monads.

5.5 The Problem of Mathematical Form and Divided Animals

The difficulty of fostering an image of Xenocrates' definition of soul, it seems, pushes Aristotle towards speculation. In one of his criticisms, he allows himself to postulate that, minimally, in order to transfer its motion to the animal it inhabits, a self-moving number needs to be *in* the animal in some sense. Living beings are, after all, ensouled things.

Since souls incidentally inhabit particular places, namely the place of the animate bodies they ensoul, then if the soul is a number, according to the demonstrative heuristic, we need to be able to imagine the way in which this number manifests itself in a living body, and how it will provide motion to it.

This concern appears in an argument that depicts Xenocrates' self-moving soul as the *mathematical form* of a living being. Aristotle argues:

Still, if one subtracts a number from another number, one is left with a different number. But plants and many animals that have been divided continue to live and have the same species of soul [in the divided parts]. (*DA* I.4, 409a7–10)

Although in his criticisms of the *Timaeus* Aristotle rejects the idea that soul (insofar as it is identical to mind) is something extended, here he shows that he is still concerned with explaining how soul can interact *with* extended things. He thus takes seriously the idea that, if the soul is the numerical form of a certain kind of body, then, like any quantity, if some of that number is taken away from the body, a different quantity should remain (even if that quantity is still a soul-number).

The most natural way of taking away some of this number, he thinks, is to spatially divide the body in which the soul-number resides. If a soul-number is identical to the Form-number Ten, for instance, then splitting a plant equally into two should either destroy the soul-number by leaving behind two plant halves that each have soul Form-numbers equal to Five, or produce different *kinds* of souls in both halves (if there is a kind of soul identical to the Form-number Five). However, Aristotle points out that, in *many* cases, if an animate body is divided, the halves do not come to possess a different kind of soul.²⁹

This passage provides a further piece of evidence that Aristotle does not want to confine himself to *endoxa* in criticising earlier Greek psychologies. In order to construct this criticism, he appeals not only to a putative conceptual truth about numbers, but also to the empirical datum that some living things exhibit the same life functions when divided. This is *not* a common belief. Indeed, it would take time and effort to perform this experiment on plants and 'many' (πολλά) animals.³⁰

²⁹ The assumption must be that the quantity that is soul will be equally distributed throughout the body.

³⁰ Aristotle discusses some of these experiments in cutting up plants, insects, and also a tortoise, in *Iuv.* 2, 468a13–b15.

Is this criticism fair? Here is a reason to think that it is not. Suppose that Xenocrates thought of souls as material entities (e.g. potentialities in the indefinite dyad) that were souls in virtue of imitating the Form-number Ten. If this were the case, there seems to be no reason why all the parts of a living body would not continue to participate in the Ideal-Ten once divided. Even so, if Xenocrates took this route, he would face another problem.

Assume that Aristotle is right that, for 'self-moving number' to be the real definition of soul, we need to be able to imagine how a self-moving number can cause motion in the body in accordance with the demonstrative heuristic. If Xenocrates claims that the self-moving number that is identical to soul is not really *in* the body, but in the realm of Form-numbers, then it would appear that *this* number either will not move itself, or, that its motion will not be explanatory of the body's motion. On this interpretation, Xenocrates' self-moving number either turns into an *unmoved* Form-number moving the body, or a *moving* Form-number, which, insofar as it exists separate from perceptible things, is not explanatory of the type of motion affirmed to belong to the soul as one of its *per se* attributes.

5.6 The Problem of Monadic Difference

Taken together, these questions raise a more fundamental difficulty about Xenocrates' rejection of Plato's *Intelligible Substance Pluralism*, which holds that mathematical objects are intelligible objects that are distinct from both perceptible things and Forms. Plato's postulation of intermediate mathematical objects provided him with a certain explanatory advantage over members of the Academy who held that Forms alone were the source of intelligible being for perceptible objects. This is because Plato seems to have affirmed (at least, as a likely story) that mathematical objects, such as indivisible two-dimensional triangles, could enter into the actual composition of the material elements – fire, air, earth, and water. For this reason, Plato could appeal to the properties of these mathematical objects in his explanations of the perceptible properties of the materials they composed, such as in the *Timaeus*' explanation of the ordered geometrical transformations of the elemental bodies into one another. However, Xenocrates' rejection of these mathematical in favour of *Mathematical Platonism* leaves him with a problem: how do Form-numbers govern the structure and motions of a plurality of perceptible objects without being in them? As we saw above, the explanatory connection of these Form-numbers to the cognitive and motive faculties of the soul, which Aristotle canvasses in *DA* 1.2, is shrouded in obscurity.

It is perhaps for this reason that Aristotle seems forced to speculate about how Xenocrates' *might* get his soul-number to move the body. To do so, he hypothesises that the motion that belongs to a self-moving number might be local. If so, Aristotle argues, then a soul-number might conceivably be self-moved if it contains (i) a part that causes motion whilst being unmoved, and (ii) a part that suffers the motion of the first part. This is a theorem that Aristotle establishes in *Phys.* 8.5.³¹ He writes:

But it would seem to make no difference if one said that the monads are tiny little bodies. For even if points came to be from the miniscule spheres of Democritus, with only the quantity [of the original spheres] remaining, there would be something in that quantity that is the mover, and something that is moved. For it is not in virtue (διὰ) of something differing in size or in smallness that this follows, but because (ὅτι) of the quantity (ὅτι ποσόν). For this reason, it is necessary for there to be something that will move the monads. (*DA* 1.4, 409a10–16)

In this passage, in accordance with the imaginative component of the demonstrative heuristic, Aristotle uses a thought experiment to show that, if we imagine Democritus' spherical atoms turning into extensionless points, the same law of motion that applies to the self-motion of a collection of atomistic spheres will apply also to their quantity as points. Thus, if Xenocrates is right that soul is a self-moving number, scientifically speaking, within its number there must be a motor monad, and a moved monad (or set of monads).

However, the consequence of there being a mover-monad in the soul number that is distinct from the moved-monads in this number, is that a soul can no longer be identified with *all* of the monads within its numerical essence. He writes:

But if in the animal what produces motion (τὸ κινεῖν) is the soul, then also in the number; so it is not the case that the soul is both what produces motion and is in motion (οὐ τὸ κινεῖν καὶ κινούμενον), but it is only that which produces motion. But then, how is it possible for this to be a monad? For there must belong to it some difference from all the other monads, but what difference could there be for a monadic-point (στικμῆς δὲ μοναδικῆς) except position (θέσις)? (*DA* 1.4, 409a16–21)

For Xenocrates definition of soul to be scientific, Aristotle claims, one or more of the monads within the soul's number should be identified with what moves the others. Aristotle's problem with identifying one

³¹ *Phys.* 8.5, 257b1–258a2; Cf. *Phys.* 7.1, 241b34.

(but not all) of the monads in the self-moving number as essentially motive is that it entails that *this* monad would have a property that makes it different from the other monads in the self-moving number. To affirm this would be to violate the Academic principle (P4), that numbers are composed of monads that possess no qualitative differences.³²

Moreover, Aristotle says, what could the difference-making property be that would turn a monad into an agent of motion? He suggests that, if we consider monads for what they are – indivisible, extensionless entities that admit only of *mathematical* predicates – the only difference that one monad could have from any other is, as he says, a difference of spatial position. This difference, however, attaches to monads not as Form-numbers, but as points on an extended body.

It is difficult to determine whether Xenocrates would have accepted as fair Aristotle's attempt to reduce the concept of a self-moving number to that of a collection of points (and Aristotle does not say that he would).³³ However, Aristotle's suggestion is helpful for showing how we might imagine Xenocrates' Form-numbers to provide motion to animate living beings. The argument hinges upon the thought that, in order for a Form-number which is identical to soul to be explanatory of an animal's perceptible self-motion, it needs to be instantiated in particular animate beings. However, in order to call such an instantiation a 'number', we need to make sure that it retains its numerical essence, namely, being a collection of *monads*. This is because, for both the early Academy and for Aristotle, to be a collection of monads – whether abstract or concrete – is to be a number (ἀριθμός). For this reason, the most natural way to conceptualise the instantiation of a self-moving number is to imagine the soul's monads as having a location in an animate body.

5.7 The Problem of Monadic Collocation

However, imagining soul monads to be instantiated in a body presents some difficult philosophical problems. According to Aristotle, if we imagine a soul-number to be a collection of monads in a body, it is hard to

³² It is instructive to note that Leibniz, the inheritor of soul-atomism, seems to have taken it upon himself to solve Aristotle's criticisms of Xenocrates in his own monadology. On this problem, he agrees with Aristotle that monads in a body can only differ *externally* in position; however, his own monadology posits that, in virtue of being perceptive, every monad differs *internally* with respect to having different representations of the world. See Leibniz, *PE* 214 = *Monadology* 8–14; *PE* 215 = *Monadology* 19.

³³ However, cf. Horky (2013), whose study of Xenocrates' ontology in Theophrastus provides evidence that Aristotle's suggestion that a Xenocratean soul should be geometricised to imitate the Form-numbers might not be speculative.

picture the difference between soul-monads and soul-less geometrical points resident in the same animate body. This is because Aristotle takes 'monad' to be the genus of both the mathematical unit and the geometrical point – the latter being different from the former only insofar as it has spatial position.

Adding soul as another species in this genus results in a further difficulty, the result of which raises a question about the relationship that obtains between the class of things that are (i) *monads*, (ii) *motive monads/soul monads*, (iii) *geometrical points*, and (iv) *points in the body*. It seems clear that Aristotle understands a 'monad' in general as a genus under which fall different species. It also seems clear that he thinks that *motive* monads are what constitute the number that is (an instantiated and located) soul. However, here is the problem:

So then, if on the one hand the [soul] monads and the points in the body are distinct (ἐτεροί), then the monads will be in the same place (ἐν τῷ αὐτῷ) [as the points]. For they will occupy the space (χώρον) of a point. And yet, if two are in the same place, what prevents there being an indefinitely large number? For when a place (τόπος) is undivided, the things in it also are undivided. (*DA* 1.4, 409a21–5)

Aristotle offers only the slightest justification for the claim that a living thing's soul monads will co-occupy the same places as soul-less geometrical points: indivisible things, he claims, occupy indivisible places.³⁴ His idea seems to be that the only places where extensionless soul-monads can be located in the body are at indivisible (because non-extended) places in the body, and such places are *already* occupied by indivisible geometrical points. Interestingly, Aristotle does not suggest that co-location itself is a problem for Xenocrates' theory. The problem, he thinks, is that to admit the possibility of the collocation of *two* monads is to admit the possibility of the collocation of an *indefinite* number of monads.

What, however, would be wrong with admitting this? Although it might be strange to affirm that there are an indefinite number of objects at a single 'place' in the body, it is not absurd. Indeed, Xenocrates might respond by saying, 'Yes, Aristotle, it *is* metaphysically *possible* that there are an indefinite number of monads at a given indivisible place, but in

³⁴ Aristotle seems to be making use of a Platonic assumption by identifying 'space' (χώρα) and 'place' (τόπος). See *Phys.* 4.2, 209b11–16. There is no reason to doubt that Xenocrates would not have followed Plato in this. Aristotle himself denies that points can have places. See *Phys.* 4.1, 209a11–13; *Phys.* 4.5, 212b23–7. See Morison (2002).

fact, my old friend, at any given indivisible place in the body, actually, there is only *one* geometrical point and *one* psychological monad'.

We need to find a more fundamental reason why Aristotle might think that the possibility of an infinite collocation of monads is absurd. A plausible suggestion is that he thinks that admitting *monadic collocation* is just as absurd as admitting *bodily collocation* – a physical impossibility that he thinks Democritus might be committed to.³⁵ In the *Physics*, Aristotle claims that bodily collocation is impossible.³⁶ It is not hard to think of reasons why admitting bodily collocation would be problematic. For instance, if it were possible for bodies to be spatially collocated, it would follow that, whenever we saw one body at a particular place, there might in fact be two bodies there, or three, or an infinite number.³⁷ Not only would these bodies be perceptually indistinguishable from one another, but one could not even know which one of them one was perceiving at any given time, as there would be no marker by which to determine which particular body amongst a multitude of collocated bodies was manifest to perception at the location in question. From the vantage point of explanatory parsimony, this is clearly an undesirable thesis.

Even so, there is no reason why Xenocrates would need to accept that monadic collocation entails bodily collocation. Indeed, since he is reported to have affirmed the incorporeality of soul,³⁸ it would be preferable for him to argue that monads generally, being of an incorporeal nature, are exempt from Aristotle's stricture on collocation. He could argue that this principle only applies, if anywhere, to physical bodies.³⁹

However, there is a larger point suggested by Aristotle's worry about collocation. The problem is *not* that it makes no sense to claim that a non-corporeal numerical soul and a body are located in the same place(s). Rather, it is that this interpretation of Xenocrates' definition of soul, which takes 'number/collection of monads' as the soul's genus, does not facilitate a good guess at the soul's differentia (since the differentia cannot

³⁵ *DA* 1.5, 409b2–4.

³⁶ Cf. *Phys.* 4.1, 209a4–7; *Phys.* 4.3, 210b18–21; *DA* 2.7, 418b13–18. On this history of the collocation problem, see Sorabji (1988, 60–122).

³⁷ This would entail that, each time we judge that there is only one object at a place, we are literally in danger of mistaking a tree for a forest.

³⁸ Cf. Nemesius, *De Nat. Hom.* 30 = Xenocrates (Heinze, Fr. 66).

³⁹ The often maligned medieval question concerning how many angels can be present at a single place, such as on the head of a pin, is related to this problem. If one admits into one's ontology objects that lack spatial extension, whether points, numbers, or souls, then it seems to follow that as many of such beings as you please can be 'at' a particular point filled by a body. Cf. Aquinas, *Summa* I, Q.52, A.3.

be 'in the body'). Without this differentia, a living thing's soul-monads will be indistinguishable from its geometrical points.⁴⁰

5.8 The Problem of Monadic Panpsychism

Given the difficulty of distinguishing soul monads from geometrical monads in the body, Aristotle suggests that it might be more desirable for Xenocrates to simply collapse the distinction between soul monads and geometrical points in the body, and simply identify the collection of all the monads in the body with the collection of monads that is a soul-number. This possibility is probably not one that Xenocrates would want to affirm, especially since his theory, according to *DA* 1.2, only connects the first four natural numbers, and no others, with specific psychological faculties.

Even so, this view might have held some attraction for the Academy under Xenocrates. It would perhaps appeal to those who believed that we have good reasons to believe in at least one class of incorporeal objects, namely, geometrical monads like points, and that the soul is incorporeal and present *in* living bodies. Given these beliefs, one might plausibly suppose that nothing prevents geometrical points in bodies from being identical to soul monads. This amounts to a crude mathematical hylomorphic conception of living beings. However, if we allow that all geometrical monads are soul monads, Aristotle thinks, we run into a soul proliferation problem. He writes:

But if, on the other hand, the points in the body are the number of the soul, or if the number of points in the body is the soul, what is the explanation (διδάξει) for why all bodies do not have soul? For points seem to be on all of them and to be indefinite (ἄπειροι). (*DA* 1.4, 409a25–8)

The charge here is that identifying the geometrical points in a living body with soul monads seems to entail panpsychism. The problem with panpsychism is that it entails the denial of the original phenomena from which the *De Anima*'s investigation into the nature of soul began. This is that there are basic differences between things with soul, and things without soul, namely, that the former are characterised by the *per se* attributes of having the abilities to move and to perceive. If one were to adopt a theory

⁴⁰ Leibniz solves this problem by denying that psychological monads have to occupy the space of geometrical points, on the grounds that geometrical points are best viewed as conceptual abstractions. See Leibniz, *PE* 34 = *Primary Truths*; *PE* 146–7 = *Notes on Foucher's Objection*.

of soul that rejected these basic differences between living and non-living things, then one will have no *per se* attributes left for a scientific definition of soul to explain.

5.9 The Problem of Separability

Another problem that Aristotle has with the hypothesis that geometrical monads in the body are identical to soul monads is that it would seem to entail the falsity of a thesis that Xenocrates' seemed to have accepted, namely, that soul is separable from the body.⁴¹ He writes:

Still, how will the points be able to be separated (χωρίζεσθαι) and set loose (ἀπολύεσθαι) from bodies, unless lines are indeed divisible into points? (DA 1.4, 409a28–30)

Aristotle's criticism is intelligible within the context of ancient geometry, in which points were understood to be limits of lines, or 'places' at which lines were divided from one another, and not, as in modern Cantorian set theory, the entities from which a line is composed. Given this, Aristotle asks how one could conceive of points as floating free of lines, in accordance with the imaginative component of the demonstrative heuristic.

Although Aristotle does not himself say what would be wrong with imagining the alternative, that geometrical lines are divisible into points, and hence that the body's geometrical/soul monads *could* be separated and set loose from living bodies, we can reconstruct what problems this view might face. One such problem would be that there would be no way to guarantee that a collection of soul monads that served as the form of a living body would *stay* collected as a soul once separated from it.⁴² For instance, assume that one's soul is identical to oneself as a person. What if half of the soul monads in my body, once separated at death, were 'counted' with half of the soul monads released from your body? This would seem to result in a new person that was half-you and half-me. Indeed, we can go further. If the other half of my soul monads were counted in the way mentioned above with the other half of your soul monads, then after our respective deaths, there would

⁴¹ Cf. Damascius, *In. Phd.* 177.1–7 = Xenocrates (Heinze, Fr. 75). Cf. Schibli (1993).

⁴² Leibniz accepts this horn of Aristotle's dilemma. All extension, according to him, *is* made up of monads. Leibniz, *PE* 213 = *Monadology* 1–2. However, he avoids the criticism by claiming that one's own soul is not a *collection* of monads (as one's body is), but rather a *single monad* within this collection, which cannot be destroyed except by an act of divine willing. See Leibniz, *PE* 213 = *Monadology* 4–5.

be two souls, each of which was half you and half me. This criticism confirms that, alongside his attempt to see if earlier definitions of soul can explain its two *per se* attributes, Aristotle is also taking seriously the possibility that ‘the ability to be separated from the body’ might need to be added to this list.

5.10 The Explanatory Failure of Xenocrates’ Definition of Soul

A final blow against Xenocrates’ definition of the soul brings the imaginative component of Aristotle’s demonstrative heuristic into the foreground. In it, Aristotle establishes that ‘self-moving number’ has value only as a dialectical definition of soul. He writes:

Indeed, for those who weave together into the same thing motion and number, both these things and many others of this sort result. For not only is it impossible for this sort of thing to be the definition (ὀρισμὸν) of soul, it is also impossible for it to be an attribute (συμβεβηκός). This would be clear if someone attempted, from this account (ἐκ τοῦ λόγου), to give an explanation (ἀποδιδόναι) of the affections and the works (τὰ πάθη καὶ τὰ ἔργα) of the soul, such as calculations (λογισμούς), perceptions (αἰσθήσεις), pleasures, pains, however many of these sorts of attributes there are; for just as we said earlier, neither are they easy to divine (μαντεύσασθαι) from these accounts. (DA I.5, 409b13–18)

Here, Aristotle argues that Xenocrates’ account of soul as a ‘self-moving number’ can be judged as failing the test of the demonstrative heuristic, since it also does not show how we can deduce from it any of the soul’s specific *per se* attributes. The most one could get from Xenocrates’ definition, according to Aristotle, would be the putatively explanatory syllogism:

1. [A] Attribute P belongs_{per se} to [B] all self-moving number, *N*.
2. [B] Self-moving number, *N*, belongs_{def} to [C] all soul.
3. [A] Attribute P belongs_{per se} to [C] all soul.

Here, Aristotle argues that, regardless of what number we actually plug in for *N* (e.g. 2, 3, 4), and regardless of what known properties of number we pick (e.g. divisible by two, prime, etc.) – even using a technical description of the nature of Form-numbers and their monadic constitution – we cannot imagine any better what a psychological attribute such as pain, or pleasure, *is*, or is caused by, in the way in which we might understand better what thunder is by conceiving of it in imagination as a type of noise caused by fire being extinguished in the clouds. The implication is that the

definition of soul as 'self-moving number' does not even facilitate a guess at what such attributes are. As such, and according to Aristotle's demonstrative heuristic, this definition must be a dialectical and empty one.

5.11 The Results of Aristotle's Criticism of Xenocrates

Given the highly technical nature of Aristotle's criticism of Xenocrates' theory of soul, it is difficult to see what developmental constraints it places, if any, on Aristotle's own hylomorphic psychology. However, there is one feature of Xenocrates' theory of soul that Aristotle finds attractive: in it, soul is defined as incorporeal, and not a bodily entity. This poses an interesting question about the development of hylomorphic psychology. Since Aristotle can accept that forms belong in every category of being, whether substance, quantity, quality, or relation, how then did he come to believe that soul is a *substantial* form, when there are other formal contenders for the crown, such as Form-numbers, or geometrical surfaces composed of points? The investigation of Xenocrates' theory of soul gives Aristotle the chance to inquire, and inquire deeply, into the *kind* of form that the soul might be.

Positively, Aristotle's criticism of Xenocrates' explanation of how soul-monads could act as an incorporeal mover of the body places a weak constraint on Aristotle to affirm the *Efficient-Final Causal Thesis*. However, more important is the strong negative constraint placed on him by his criticisms: if soul is an incorporeal form or form *of a body*, rather than itself a body, it cannot be an *arithmetical form*, i.e. exist in the category of quantity.

This idea is also suggested in *DA* 1.1, where Aristotle argues that, in the case of defining an activity or affection that is common to soul and body, one needs to specify a kind of form that involves motion or activity, and the kind of body which that form needs to carry out this motion. Aristotle suggests that the forms understood by a mathematician (ὁ μαθηματικός) do not have an explanatory connection to particular kinds of natural bodies, because mathematical attributes are generated by abstracting away (ἐξ ἀφαιρέσεως) from the attributes of natural bodies.⁴³ Aristotle's criticisms of Xenocrates show in a concrete way why such mathematical attributes do not account for the soul's *per se* attributes in the body.

⁴³ *DA* 1.1, 403b14–15.

Aristotle's criticism of Xenocrates also places a further negative constraint on him with respect to the way he will formulate the *Hylomorphic Thesis*: any definition of soul that implies that its nature can be explained by its being a mathematical object, such as an aspect of a living body (e.g. its shape, the points on it, or its quantity) cannot be correct. This is because mathematical forms, as opposed to natural forms, do not facilitate deductions of psychological properties. We will see in the next chapter that a similar anti-mathematical criticism also applies to the harmony theory of soul.

CHAPTER 6

Harmonic Psychology

Since, then, all other things seemed in their whole nature to be modelled after numbers, and numbers seemed to be the first things in the whole of nature, they supposed the elements of numbers to be the elements of all things, and the whole heaven to be a musical scale and a number. And all the properties of numbers and scales which they could show to agree with the attributes and parts of the whole arrangement of the heavens, they collected and fitted into their scheme; and if there was a gap anywhere, they readily made additions so as to make their whole theory coherent.

Aristotle, *Metaphysics* A.5, 985b33–986a8 (Trans. Ross)

6.1 Introduction

We have seen that for Aristotle a good scientific account of the soul will need to include some reference to a principle that explains the soul–body relation. Ideally, this principle will be one that accords with the *Axiom of Causal Association*. There is at least one earlier Greek theory of soul that seems to fulfil this requirement. This is the Pythagorean view that the soul is a certain harmony or attunement (ἁρμονία) of the body, in the specific sense of ‘blend’ (κρᾶσιν) and ‘composition’ (σύνθεσιν) of the opposing materials that constitute it.¹

The harmony theory of soul was a live one for members of the Lyceum, since two of Aristotle’s students – the famed musical theorist Aristoxenus (fl. 335 BC), and the philosopher Dicaearchus (c. 350–285 BCE) – are reported by Cicero to have believed in it. Cicero tells us that Aristoxenus

¹ *DA* 1.4, 407b27–32. This theory may be the one Aristotle refers to at *DA* 1.2, 405b23–4. See Gottschalk (1971, 180); Ilievski (1993); Caston (1997, 319–20).

held that the soul was 'a certain tension of body' (*corporis intentionem quandam*), analogous to the physical attunement that musical instruments possess when functioning properly. On Aristoxenus' view, what we call 'soul' is in reality the collection of material tensions in a body that govern the various kinds of motions that can be produced by an attuned body in response to external influences.²

Dicaearchus is reported by Cicero to have held a similar view. He thought that we can reduce the essence of soul to the properties of the elemental powers and their combinations, and in so doing, come to see that 'soul' is not an entity in its own right.³ Although Cicero depicts both views as profoundly un-Aristotelian, going so far as to cheekily suggest that Aristoxenus stick to his own expertise at music, and 'leave the study of the soul to his master, Aristotle' (*haec magistro concedat Aristoteli*), the evidence suggests that the harmony theory of soul was nevertheless a live option for both Aristotle and his students. Thus, understanding what problems it is alleged to have should help us to understand how it is distinct from Aristotle's own hylomorphic psychology, along with what role it played in its development.

I argue below that Aristotle's criticisms of the harmony theory of soul have two results, one negative, and one positive. Negatively, they show that the harmony theory is unable to account for any of the soul's *per se* attributes; positively, they show that it *is* able to account for two crucial and interrelated phenomena: why, when a living body or one of its vital organs is destroyed, the soul departs, and why, when soul departs a living body, that body's vital organs are destroyed and it decays.

I first discuss Aristotle's analysis of the harmony theory of soul (Section 6.2), before going on to discuss Aristotle's arguments against it (Sections 6.3–6.6). I claim that each of these arguments, in accordance with the demonstrative heuristic, is aimed at showing that one cannot deduce from a harmonic definition of soul its *per se* attributes. I go on to show that Aristotle's parenthetical remarks about Empedocles are similarly scientific in nature. They aim to show that the latter's psychology – if interpreted as a kind of harmony theory – cannot account for the relation that obtains between soul, Love, and the ratios that are said to define some mixtures (Section 6.7). I then argue that Aristotle's puzzle about harmonic psychology suggests that something about the harmony theory of soul is correct, and points the way towards the *Hylomorphic Thesis* that

² Cic. *Tusc. Disput.* 1.10. Cf. Hippoly. *Ref. haer* 2.12 = Diels 557.

³ Cf. Cic. *Tusc. Disput.* 1.18. On Dicaearchus, cf. Fortenbaugh and Schürtrumpf (2001).

body and (some parts of) soul are definitionally and existentially interdependent (Section 6.8). I end with a summary of the results of Aristotle's criticism of the harmony theory (Section 6.9).

6.2 Aristotle's Account of the Harmony Theory of Soul

Aristotle introduces the harmony theory of soul as follows:

And another certain opinion has been handed down concerning the soul, which is no less persuasive to the many than any of the other accounts spoken about the soul, but has received as it were a public examination in the common discussions. For they claim that the soul is a certain type of harmony; for they say that harmony is a blending (κρᾶσιν) and composition (σύνθεσιν) of opposites, and that the body is composed (συγκεῖσθαι) from opposites (ἐξ ἐναντίων). (*DA* 1.4, 407b27–32)

The theory so specified seems quite powerful: first, it seems to provide an explanation of the soul–body relation.⁴ Because a body can be organised in such a way as to be, loosely speaking, ‘in tune’ in terms of its parts and material stuffs, it gives a reason for why the soul is ‘in’ the body. Second, it also seems to provide a description of the *state* that the body must be in to have a soul, namely, a state characterised by being a balance between causally opposing elemental stuffs.⁵

More worryingly, it is not clear how this theory of soul differs from Aristotle's.⁶ Could not bodily opposites, or their mixtures, *qua* bodily, have the potentialities for nutrition, perception, and reasoning that Aristotle assigns to souls? And could not the fulfilment of these potentialities just *be* the mathematical ratios that such opposites come to be in when living bodies are organised in the right way? Moreover, does not Aristotle himself suggest that some kind of harmony is the form of the body when he likens ‘musical attunement’ (συμφωνία)⁷ in strings to a ‘certain form/ratio’ (λόγος τις), which is definitive of the soul's perceptive capacity?⁸ Below, I shall argue

⁴ However, as Philop. (*In de anima*, 146.6–8) points out, the reported reasoning in fact forms an invalid syllogism.

⁵ See Gottschalk (1971, 188).

⁶ The similarity between the two theories is noted by Hicks (1907, 263), and supported by Ross (1961, 195), Gottschalk (1971, 188), and M. Frede (1992). Polansky (2007, 103–4) is more cautious, stating that the harmony theory ‘might be supposed very close to Aristotle's own’.

⁷ Generally, Aristotle uses συμφωνία to refer to a relationship between (actual or potential) sounds. Cf. *DC* 2.9, 290b12–29; *DA* 1.3, 406b30; *APo* 2.2, 90a19–23. On meaning of the adjective συμφωνός as applying primarily to number, see Barker (2007, 316ff).

⁸ First at *DA* 2.12, 424a25–32, then at *DA* 3.2, 426a27–b7. Cf. *DA* 2.11, 424a4–5. On these passages, cf. Ward (1988); Bradshaw (1997) and Barker (1988).

that despite the *prima facie* resemblance of the harmony theory of soul to Aristotle's own theory, the answer to all of the above questions is 'no'.⁹

6.3 The Movement Argument

In order to understand the harmony theory of soul, Aristotle first disambiguates two possible meanings of 'harmony'.¹⁰ The term 'harmony', he says, refers either to some *arithmetical* ratio (λόγος τις) or proportion that holds between the ingredients of mixtures (μιχθέντων), or to a *geometrical* composition (σύνθεσις) that characterises objects whose parts have been put together in a particular way (e.g. on top of, beneath, next to, etc.).

Aristotle's most general argument against the harmony theory of soul – in both its arithmetical and geometrical sense, is that, 'the power to initiate motion (τὸ κινεῖν) does not belong to harmony, but all assign this most of all to soul'.¹¹ This argument is simple: it claims that the soul's *per se* attribute of being productive of motion belongs to soul, but not to harmony. It has the structure of a simple syllogism:

1. [A] The power to cause movement belongs_{per se} to [B] no harmony.
2. [A] The power to cause movement belongs_{per se} to [C] all soul.
3. [C] Harmony belongs_{def} to [C] no soul.

Aristotle here accepts Plato's criticism of the harmony theory of the soul in the *Phaedo*,¹² which is that it denies to soul 'top-down' causal control over the body. However, the scope of Aristotle's claim here only extends to the soul's ability to initiate the *local motion* of animals, and not to other psychological attributes. Aristotle's point is that a harmony in the body provides, at best, a causal limitation on the kind of local motion that the body can *suffer*. The tension in the strings of a lyre, for instance, limits the sorts of motions they can undergo, as well as the sorts of sounds that result from those motions. However, a particular tension cannot *originate*, cannot *cause to move*, a lyre's strings, despite being 'in' those strings. Contrariwise, Aristotle points that soul, being 'in' the body, has as one of its granted *per se* attributes the power to originate the body's locomotion from the 'top-down'. Further, in the case of animals such as ourselves, this power is a rational one, such as the power of choice, as he claimed against Democritus.¹³

⁹ Cf. Heinaman (1990, 88–90).

¹⁰ *DA* 1.4, 407b32–4. Cf. Jaeger (1934, 45) and the criticism of Owen (1968b, 152–3).

¹¹ *DA* 1.4, 407b34–408a1.

¹² *Phaed.* 93a6–9. Cf. Charlton (1985, 136); M. Frede (1992, 101).

¹³ Cf. *DA* 1.3, 406b24–5; *Phaed.* 99a5–b2. See Chapter 4, Section 4.7.

6.4 The Harmonising Explanation Argument

Despite the fact that a harmony or harmonic tension lacks a direct power to cause motion in bodies, Aristotle accepts that there are plenty of attributes that belong to living things that an harmonic principle *can* explain, such as a living thing's health, and the nature of bodily virtues.¹⁴ However, he argues that, once we see *why* the principle of harmony explains these bodily attributes, we can also see why it does *not* explain the soul's attributes. He writes:

But it fits (ἀρμόζει) more with health to say it is a harmony, and generally the bodily virtues, than soul. This would be patently obvious if someone were to attempt to give an explanation (ἀποδιδόναι) of the affections and activities (τὰ πάθη καὶ τὰ ἔργα) of the soul with reference to a particular harmony; for it is difficult to fit them together (ἐφαρμόζειν). (*DA* 1.4, 408a1–5)¹⁵

We find a good example of how the former sort of *per se* attributes of living things might be demonstrated using 'harmony of bodily opposites' as a middle term in *Phys.* 7.3:

Still, we say that all the virtues reside in something and in relation to the state of something (ἐν τῷ πρὸς τί πως ἔχειν). For the virtues of the body, such as health (ὑγίειαν) and vigour (εὐεξίαν), we posit as being in a blend (κράσει) and right proportion (συμμετρίᾳ) of warmth and cold, either in relation to themselves inside the body or in relation to the surrounding environment. (*Phys.* 7.3, 246b3–6)

Here, the principle of a 'right proportion' of warmth and cold in the body is equivalent to the idea of bodily opposites being 'in harmony'.¹⁶ Based on the principle that health is a harmony of warm and cold blends in the

¹⁴ On the bodily virtues, see *Rhet.* 1.5, 1361b7–22.

¹⁵ Philop. (*In de anima*, 144.30–145.7) suggests that Aristotle is here invoking an argument that he gave in his lost dialogue, the *Eudemos*, which was that, if 'harmony of the ensouled body' were the correct genus of soul, then one of the species of 'harmony of the ensouled body' (i.e. health, strength, etc.) would have to be identical to soul. However, since none of those harmonies is necessary for something to be ensouled, if soul is a type of harmony, it is at least not a harmony *of the ensouled body*. Philoponus interprets Aristotle's argument in *DA* 1.4 similarly: once we explicate all the known species of harmony, from bodily harmonies to musical harmonies (for example, Lydian, or Phrygian harmonies), we can see that none of the soul's affections or states, such as anger, courage, etc., fall under any of these species. This is why they do not theoretically 'fit' with harmony. See Philop. (*In de anima*, 127.21–3). This is also the interpretation of Sophon. (*In Aristotelis De Anima*, 25.27–31), except that he puts the objection in terms of the soul's parts. Cf. Philop. (*In de anima*, 147.20–2). Cf. *Top.* 4.3, 123a33–7, *Top.* 6.2, 139a32–140a2.

¹⁶ Aristotle makes a similar claim about health being a *συμμετρία* at *NE* 10.3, 1173b23–8, but adds that this proportion consists in a range which can be relaxed up to a certain point in someone without losing health.

body, one can demonstrate, in accordance with the demonstrative heuristic, that the body will undergo certain diseases when the harmony of warm and cold blends inside it is disturbed (such as when too much warm material or cold material predominates). By analogy, Aristotle alleges that, if we define the *soul* as a harmony of bodily opposites, we should be able to demonstrate *which* bodily opposites, and in what proportions, are identical to the soul and its powers, and which ones, when changed, will cause them to be destroyed. This, Aristotle alleges, the harmony theorists have not provided.

However, in theory, could not a sophisticated harmony theorist, such as Dicaearchus, meet Aristotle's challenge by showing exactly which elemental opposites, and in what proportion, constitute the soul? For Aristotle's claim to stick, he needs to have good reasons for thinking that the qualities present in a bodily harmony are *in principle* unable to explain the nature of the soul's active and passive attributes.

That he does have such reasons might seem dubious. He is certainly committed to the idea that the elemental bodies that compose the mixtures that constitute the material side of living bodies do have causal powers. Some of these are dispositions to move in certain directions, others, dispositions to mix with other elemental bodies in a certain way. Since Aristotle will eventually affirm that the soul is the form *of* such an elementally constituted body, could not 'soul' for him be a term that refers to these independently specifiable lower-level elemental powers and processes? Aristotle did wrestle with this question, and his answer is 'no'.

In *GC* 2.6, Aristotle both recognises and decisively rejects this materialist and reductionist view of soul.¹⁷ He reasons as follows:

But it is also absurd if the soul comes into being from [a mixture or composition of] the elements, or if it is one of the elements; for how will there be alterations (ἀλλοιώσεις) of the soul, such as being musical and again unmusical, or memory or forgetting? For it is clear that, if soul is fire, then the only affections (πάθη) belonging to the soul will be the ones belonging to fire *qua* fire, but if soul is a mixture, only bodily attributes (τὰ σωματικά) will belong to the soul; but none of the soul's attributes are bodily. However, the discussion of these things is the task of another theory. (*GC* 2.7, 334a10–15)

Whereas contemporary philosophers of mind allege that there is an explanatory gap between third-person accounts of the neuronal activities of the

¹⁷ Joachim (1922, 239) also notes the relevance of this passage to *DA* 1.4.

brain and first-person accounts of the *qualia* experienced in consciousness,¹⁸ here, Aristotle posits an analogous explanatory gap between psychological changes *qua* psychological and material changes *qua* material.¹⁹

This explanatory gap follows from Aristotle's theory of elemental change and mixture set out in *On Generation and Corruption*. As we saw in Chapter 2, in this work, Aristotle establishes his *Axiom of Causal Association*, which states that the metaphysical condition for things to be able to interact with one another by nature is that they fall under a common genus and are related to one another as specific opposites. Aristotle puts this principle to work in his explanation of how natural elements are able to form mixtures. He holds that, in order for two (or more) things to form a 'harmonious' mixture, they must (i) come into contact with one another, (ii) have characteristic opposing qualities (for example: hot and cold, white and black),²⁰ and (iii) have their characteristic powers equalised (ἰσάζῃ) rather than destroyed.²¹

When elemental bodies come together and affect one another in such a way that neither loses its original characterising power completely, Aristotle claims that they form a mixed or composite body with intermediate qualitative powers, such as flesh and bone.²² He writes:

Thus, first the elements change into one another, but out of the elements flesh and bone and the other composite bodies come about, while the hot is coming about from the cold, and when the cold is coming about from the hot, and these elemental qualities arrive at a mean qualitative state. For at that point there is neither [hot nor cold], but the middle is on a 'spectrum' (πρὸς) and not indivisible. Similarly, even the dry and the wet and the other powers of this sort, with respect to a mean state, produce flesh and bone and the other composite bodies. (*GC* 2.7, 334b23–9)

Although Aristotle's theory of mixture is not very precise,²³ in general, it is based upon the idea that there are no true 'emergent' properties – i.e. *fundamentally* new properties that come into being or 'supervene' upon lower-level material objects or processes in a way that can only be correlated

¹⁸ For example, Levine (1983); Searle (1997). Cf. Code (1991).

¹⁹ I take it that Aristotle thinks that τὰ σωματικά refers to all the bodily and perceptible attributes that can be defined *without reference to soul*. However, this does not entail that any psychological attribute can be defined without reference to τὰ σωματικά.

²⁰ Cf. *GC* 1.7, 323b29–324a9. Aristotle claims this is the case when an *x* and a *y* have 'the same [type of] matter' (ἡ αὐτῇ ὕλη). Cf. *GC* 1.10, 328a20.

²¹ *GC* 1.10, 328a18–32.

²² Cf. Hussey (1991, 222).

²³ See Bogen (1996).

with – but not understood or explained by – specific potentialities and qualities *already present* in some manner in the subvenient base materials.²⁴

Instead, Aristotle's theory of mixture casts putative 'emergent' material properties as reducible to more basic elemental powers – the moist, the hot, the cold, and the dry – and their combinations. For instance, Aristotle thinks that, from the basic elemental powers of the moist and the dry, which he generously defines, respectively, as (a) being/not being determinable by something else, and (b) being/not being able maintain a limit, one can derive the higher-level properties of being 'fine', 'course', 'viscous', 'brittle', 'soft', and 'hard'.²⁵ This is because Aristotle casts each of these higher-level properties as deducible from the *scalar modifications* of the powers of the moist and the dry as specified in (a) and (b). In his theory of mixture then, Aristotle is a reductionist, and not a supervenience theorist or an emergentist.²⁶ This commitment sets a high bar for the harmony theory of soul.

Firstly, in order for the principle 'harmony of bodily opposites' to be explanatory of the soul's *per se* attributes (such as growing angry, or becoming musical), one would need to find opposite elemental powers (for example: hot and cold),²⁷ along with a ratio that characterises their mixture in a particular body, which were not only *correlated* with some psychological activity or affection in that body, but *wholly constitute* it.

However, as Aristotle argues here, the sort of *per se* attributes that result when perceptible elemental bodies are mixed are *not* emergent psychological powers – such as the ability to initiate locomotion from rest and rest from locomotion, or the ability to love, or hate, or think. Instead, they

²⁴ Pace Caston (1997, 338, n. 69). For further reasons why Aristotle is not an emergentist, see Goldin (1996, 152, n. 17), and Miller (1999, 327–33). More generally, Aristotle's solution to Parmenides' puzzle about the possibility of change from *X* not-being *P* to *X* being *P* (and vice versa) – which takes the predicate 'not-being *P*' to mean 'being-*P*-in-potentiality-but-not-*P*-in-actuality' – coheres better with a reductionist view about new *X*'s and *P*-properties rather than an emergentist one.

²⁵ *GC* 2.2, 329b29–33. Aristotle concludes that *all* the non-primary perceptible properties can be *reduced* (ἀναγόνται) to the primary four elemental powers (*GC* 2.2, 330a24–5). It is an unfortunate and recurring sophism in some Aristotelian scholarship that Aristotle's notion of 'reducing' a given item to more primary items is never equivalent to our modern scientific or philosophical notion of explanatorily reducing one property to another (e.g. reducing heat to molecular motion). The notion of reduction that Aristotle describes here is more or less exactly our modern one.

²⁶ Cf. Lennox (2014), who, despite defending the thesis that Aristotle is an emergentist, defines 'emergence' as a 'fusion operation' in which lower-level properties become fused into new higher level properties. However, crucially, he thinks these higher level fusions have explanatory connections to lower-level properties. This notion of 'emergence' is compatible with what I label here as 'reductionism'.

²⁷ *GC* 2.1, 329a25–35. Cf. Caston (2000, 161–2).

are attributes that fall somewhere intermediate on a scale between the original pairs of opposing elemental qualities. Hot and cold, for example, can constitute lukewarm, but not the colour green, because green is not a tangible quality. Aristotle's point is that, since the only properties that result when perceptible materials are mixed are scalar modifications of the characteristic powers of the original ingredients going into the mixture – and these characteristics are categorically distinct from psychological ones – the definition of soul as a harmony of bodily opposites cannot – *even in principle* – be used to explain the soul's *per se* attributes.²⁸

The upshot of this is that we gain a glimpse into one of the main theoretical reasons justifying Aristotle's claim that a final cause (e.g. 'for the sake of revenge' in the definition of anger) *must* be included in the definition of any psychological motion. The final cause is included because it renders intelligible the explanatory link *between* correlated material and psychological changes. Take the case of anger discussed in *DA* 1.1: for Aristotle, even if we knew all the material aspects of how blood boils around a human heart (the putative material subvenient 'base' of anger) – we could not derive or make a plausible guess at the intentional goal of this motion, namely, 'revenge'.²⁹

In contrast, if we know the final cause of anger, as well as some of its other formal and material features, we can actually explain *why* boiling of blood around the heart is correlated with desire for revenge. The explanation will go something like this: in order for *X*'s psychological desire to take revenge on *Y* to be actualised, *X* needs to move his body to harm *Y*. In order for *X* to move his body to harm *Y*, *X*'s body must be heated in the right way. In order for *X*'s body to be heated in the right way, the blood around *X*'s heart must boil. On a modern supervenience theory of mind or an emergentist theory which presupposes supervenience, the co-occurrence of *X*'s psychological desires and *X*'s bodily changes are brute correlations; in Aristotle's theory, they are rendered intelligible and necessary by a final cause.³⁰

²⁸ Cf. Philop. *In de generatione et corrupt.*, 268.20–7.

²⁹ *DA* 1.1, 403a29–b3.

³⁰ For this reason, Aristotle will accept that some elemental powers, such as 'the hot', can serve as a joint-cause (*συναιτίον*) of the soul's activities and affections in the body (*DA* 2.4, 416a14). However, what he cannot accept is that we can derive the *per se* attributes of the soul from the perceptible attributes of inanimate elemental bodies, whether singly or in combination. See Ackrill (1972/1973, 132–3); Burnyeat (1992a, 23). Cf. Alex. *De Anima* 2.4.21–4, who claims that the soul's powers *are* categorically new powers that supervene upon a mixture, similar to how the new powers of medicinal drugs supervene upon a mixture of their components. See Kupreeva (2004).

6.5 The Composition of Capacities Argument

Aristotle also criticises the idea that soul could be a geometrical harmony, in the sense of a spatial composition (σύνθεσις) of bodily parts capable of motion (*DA* 1.4, 408a5–11).³¹ This argument seems aimed particularly at Aristoxenus' conception of soul.³² The problem with this theory, he explains, is that there are many 'harmonious' compositions in the body. Hence, one might ask:

Of what bodily part, and how, must one conceive (ὑπολαβεῖν) mind (νοῦν) to be its composition, or of what bodily part the soul's perceptive capacity (αἰσθητικόν), or its desiring capacity (ὀρεκτικόν)? (*DA* 1.4, 408a12–13)

Aristotle's claim that no σύνθεσις of bodily parts can constitute (or be identical to) a psychological capacity like mind is difficult to understand from a modern perspective. Hence, speaking of Aristotle's rejection of the harmony theory, William Charlton laments:

'Of what parts could we suppose the mind to be a composition?' ... That question might reduce to silence a fourth century Greek but not a contributor to *Scientific American*.³³

From our contemporary perspective, Charlton is right that a modern-day harmony theorist could claim, for instance, that Aristotle's ὀρεκτικόν is in reality 'the neuronal composition of the brain's frontal cortex'. However, it is not clear that such an answer addresses the philosophical conceivability problem that Aristotle raises here.

Aristotle's charge is that, from our knowledge of the properties that a material composition has, we cannot form a plausible conception of what sort of psychological capacity or function this composition must *necessarily* be identical to. As we saw above, without a final cause, no material composition a harmony theorist picks out – whether a bi-valve

³¹ See Baltussen (1996, 339), who notes that this argument has a precedent in *Top.* 6.13, 150b22, and *Top.* 6.14, 151a20–5. However, the argument here is subtly different. The charge is not that the harmony theorist has left out an account of the manner in which a composition is identical to a psychological power. Instead, it is that we are unable *to conceive* (ὑπολαμβάνειν), amongst the known bodily compositions, why any one of them *must* be identical to the power of mind, or to the power of perception, etc. Such appeals to conceivability using forms of ὑπολαμβάνειν are absent in the *Topics* and *Sophistical Refutations*. The closest Aristotle comes to this technical use is when he appeals to how we conceive of what we mean when we use linguistic terms. Cf. *Top.* 1.7, 103a38; *Top.* 4.5, 127b32.

³² Even so, insofar as Aristoxenus considered harmonic science to be autonomous, it is unclear how he could justify extending its principles to account for the soul, unless he thought of psychology a science subordinate to harmonic science. See Barker (1984).

³³ Charlton (1985, 132).

heart, or the brain's frontal cortex – will explain why, of necessity, it would constitute a given psychological capacity. Does the composition, 'fleshy holes at the side of human heads', for instance, explain what the psychological capacity for human hearing is, any more than 'fleshy holes on the middle protrusion of the human face'? Even using one's imagination, minus a final cause it is hard to determine why a given psychological capacity would reside in any specific material composition. For this reason, Aristotle's response to a contributor to *Scientific American* who claimed that some capacity of the mind was identical to a composition in the brain would be no different than it is in *De Anima*. Knowing what material composition a psychological activity occurs *in* or *through*, i.e. knowing only its material cause, will provide at best only a partial account of what it is. For a full account of such *per se* attributes, Aristotle thinks we also need to refer to a unified efficient and final cause operating through such materials.

6.6 The Many Souls Argument

Aristotle also argues against an arithmetical version of the harmony theory, wherein soul is claimed to be the numerical proportion characterising the ratio of elements that constitute a living body. He writes:

Similarly, the account that asserts the soul to be the ratio of a mixture (τὸν λόγον τῆς μίξεως) is also absurd; for the ratio of the mixture of the elements (στοιχείων) with respect to which flesh is produced, and the ratio of the mixture of the elements with respect to which bone is produced, are not the same. So it will happen that the body will have many souls throughout itself, if indeed it is the case that these bodily parts have been mixed from the elements, and the ratio of the mixture of these elements is a harmony and soul. (*DA* 1.4, 408a13–18)

In contrast to the version of the harmony theory just criticised, which treated compositions as *materials* in a body whose spatial arrangement is identical to soul and its capacities, this version moves down to a lower explanatory level and takes soul to be a *non-material* arithmetical ratio or λόγος that exists 'between' the mixture of elements that constitute a living body's spatially arranged magnitudes.

Aristotle's problem with this version of the harmony theory is that there is not a *single ratio* that characterises a living body. Instead, there are many different ratios that characterise the elemental proportions that produce the homoeomerous mixtures that constitute a body's parts. For instance, one ratio constitutes the homoeomerous mixture that is bone, another, the

mixture that is flesh.³⁴ However, what if the harmony theorist argued that, rather than the soul being a ratio of *one* of these mixtures in the body, it was a set of *all* the ratios of all the mixtures that compose a living body? In this case, a harmony theorist might define soul thus:

Soul =_{def} the set of ratios S of all the ratios R_1 – R_n , of the elemental mixtures, M_1 – M_n that produce all of a living body's homoeomerous parts, such that $S = [R_1 \text{ of } M_{\text{flesh}}, R_2 \text{ of } M_{\text{bone}}, \dots, R_n \text{ of } M_n]$.

Aristotle has a reply: if soul is defined as the set of all the ratios in a living body, a harmony theorist would still need to explain the soul's *particular* capacities by showing how they belong, or follow from, one or more of the particular ratios *within* this set. Such an attempt would be faced with an argument similar to the one used against harmonic compositions: to which ratio-of-elements within the set specified would the soul's rational or perceptive capacity, for instance, be identical?

6.7 Empedocles and the Harmony Theory

Aristotle also considers one further (and more speculative) version of the harmony theory. This is the version that he thinks someone might ascribe to Empedocles. It is speculative in the sense that, in his preferred analysis of the latter's psychology, he takes Empedocles to imply that the soul is identical to the elemental roots along with Love and Strife – *not* the *ratio* that defines elementally composed bodies, or that Love alone might instantiate.³⁵ However, in his criticism of the harmony theory, he admits that Empedocles has the philosophical resources to define soul in another way, namely, by identifying it with one of the elements within his system of nature, or with the 'ratio' that he claims to characterise composite objects. With respect to this possibility, he writes:

But perhaps someone could at least demand an answer from Empedocles to the following questions: given that he says that each of the elements is in a certain ratio (λόγῳ), is the soul this ratio, or is it in fact something different which comes to be in (ἐγγίνεται) the parts (μέρεσιν)? Moreover, is Love a chance (τυχεύσεως) cause of the mixture, or [a cause] that is in accord with the ratio [in a mixture] (κατὰ τὸν λόγον), or is Love the ratio itself,³⁶ or something alongside the ratio (παρὰ τὸν λόγον) and different? (*DA* 1.4, 408a18–24)

³⁴ Cf. *PA* 2.1, 646a12–24.

³⁵ See Chapter 7, Section 7.2.

³⁶ This question is based upon Empedocles' depiction of Love as a part within mixed objects, which, Aristotle argues elsewhere, also turns Love into a material cause. Cf. *Metaph.* Λ.10, 1075b1–4.

In this passage, Aristotle's introduces a challenge to an Empedoclean version of the harmony *qua* ratio theory, namely, to specify what the relationship is between (i) soul, (ii) the ratio of the elements, and (iii) Empedocles' efficient cause – Love – which brings the elements together to form mixtures.³⁷

Aristotle's questions are appropriate, because while Empedocles suggests that the elemental roots are sometimes brought into ratios to produce things such as bone, he does not ever apply this doctrine to compounds in general, nor to living bodies.³⁸ More often, he emphasises the reductive claim that what a living thing is, *is* one or more of the four root-elements.³⁹

Prima facie, it would seem that Empedocles' Love is not a good candidate for the soul. In *GC* 2.6, Aristotle argues that, judging by his poems, Empedocles' Love seems to be a force of mechanical association (σύνκρισις),⁴⁰ but not a teleological principle that aims to organise the elements into ratios.⁴¹ Instead, Empedocles ascribes the creation of bodily parts and their arrangement (too often for Aristotle's liking), to chance (τύχη).⁴² This implies that Aristotle thinks Empedocles is committed to Love being a chance cause of the ratio of elements that produces living beings.

However, even if Empedocles argued that Love has some limited teleological role in bringing the elements into ratios, Aristotle has another argument up his sleeve. In *Metaph.* B.4, he points out that Empedocles' cosmology implies that the composites we now see will eventually be destroyed by Love once it has gained enough power over Strife to produce a maximal mixture of elements in the divine One. On Aristotle's (quite horrific) reading of Empedocles' cosmology, every living thing will eventually be compacted into a single mixed object.⁴³ This suggests

³⁷ Cf. DK31 B17 + Strasbourg Papyrus a(i) + a(ii) = TEGP 41[F20]; DK31 B20 + Strasbourg Papyrus fr. C = TEGP 44[F21]; DK31 B21 = TEGP 45[F22]; DK31 B22 = TEGP 46[F23]. Cf. Trépanier (2014, 184–5), who argues that this passage suggests Aristotle's awareness of an Empedoclean theory of biological substance-parts.

³⁸ See Cooper (2012, 346).

³⁹ Cf. DK31 B17 = TEGP 41[F20].

⁴⁰ *GC* 2.6, 333b12–13. Against this mechanistic reading of Empedocles, cf. Osborne (2000).

⁴¹ *GC* 2.6, 333b9–11. Cf. *Metaph.* A.4, 985a10–13, where Empedocles (along with others) is claimed only to have grasped the material and efficient cause clearly. Guthrie (1962–1981, 2.213) notes that, although Love, whether under the name of Aphrodite or Cypris, is a cause of 'all mixture', who 'joins things together (συνσπρόζει, of Aphrodite in fr. 71.4)', 'it would seem that neither the noun nor the verb can be confined to the special sense of "combine in fixed proportion"'. Aristotle's criticism that Empedocles appeals too often to chance is repeated at *Phys.* 2.4, 196a20–4, and *PA* 1.1, 640a19–26.

⁴² See Lloyd (1966, 275). Cf. DK31 B59 = TEGP [F73]. However, cf. Judson (2005).

⁴³ *Metaph.* B.4, 1000b11–12. Cf. *Metaph.* A.4, 985a27–9, where Love 'separates' out the individual masses of elements.

that the teleological role of Love, at least as Aristotle understood it, could not have as its goal a structured plurality of beings, but rather absolute unity.

Aristotle also implies that, if Empedocles could be persuaded to identify soul with an arithmetical ratio, or with something that comes to be in the parts of the body (once a ratio is formed), he could *not* affirm it to be the efficient cause of the body's staying together.⁴⁴ The only way he could do so is if he thought that Love is identical to the ratio rather than something different from it.

This is because, if Empedocles identified the soul with Love, and Love is *not* the ratio of the mixture of a living body, then he will be committed to the soul being something that comes to be in different mixtures *at random*. It will not be something essentially connected to the organisation and function of a living body. However, if he thought that the soul *is* a ratio of the mixed elements, but *not* Love, then soul would have no efficient causal control over its elemental body, which, as we saw above, is Aristotle's main complaint with all versions of the harmony theory. A specific ratio in the mixture (e.g. 2:4) has no efficient causal powers – it is simply a mathematical proportion determined by the amount of elemental stuffs (2 parts fire: 4 parts earth) present in the mixture by Love's chance operations. So, since Empedocles does not ever identify Love with the ratio itself – an image which strikes one as a distorted image of Aristotle's own theory of soul – he cannot account for the soul's *per se* attribute of causing motion in the body, nor any organising powers that might belong to it.

Even so, we can see in these queries that Aristotle is attracted to aspects of Empedocles' psychology. He likes the idea that there is some non-elemental force like Love that brings structure and organisation to elements (even if by chance); he also likes the idea that composite things need to have a λόγος – some sort of determinate structure – in order to be the sort of composites they are. However, what he cannot find in Empedocles is the *union* of formal and efficient cause in a single entity. Negatively then, Aristotle's side criticism of Empedocles' version of the harmony theory constrains him to think that, if the soul is the cause of the organisation and (non-elemental) motive powers of elementally composed living bodies, it cannot be a mathematical form of organisation.

⁴⁴ Cf. *DA* 2.1, 412b25–7; Johansen (2012, 12–17).

6.8 The Truth in the Harmony Theory

Aristotle ends his criticisms of the harmony theory by drawing attention to a puzzle that suggests that, despite its problems, it cannot be wholly false. He writes:

But if the soul is something different from the mixture, why is it taken away (ἀναιρείται) at the same time with the being of flesh (τῷ σαρκὶ εἶναι) and the being of the rest of the parts of the animal? In addition, since each of the parts does not have its own soul, and if the soul is not the ratio (λόγος) of the mixture, what is it which is destroyed (φθείρεται) when the soul has departed [the body] (ἀπολιπούσης)? (*DA* 1.4, 408a24–9)

In this discussion, Aristotle shows that there is something right about the harmony theory: the existence of at least some kinds of soul depends on the being of the animal body and its parts, and *vice versa*. His first question is based on the idea that, in a given living body, flesh will cease to function as flesh, and its body parts will cease to function as body parts, simultaneously with the soul's departure from the body. This argument assumes that the destruction of the ratio that makes a homoeomerous mixture *be* flesh, and that makes the anhomoeomerous composition of the body's parts *be* body parts – the two senses of harmony he has previously defined – also causes the soul to be destroyed. Why, Aristotle asks, would the ratio that defines flesh and the body's parts destroy soul unless the soul was itself this ratio?⁴⁵

His second question looks at this same phenomenon from the opposite direction. It asks, if soul is *not* the ratio of elements in a living body, what else could it be, given that its absence causes the body's parts to cease functioning, and perhaps destroys the ratios that are conducive towards this functioning? Given this mutual interdependence of the functions of elementally composed bodies and their souls, Aristotle's question is: what else could soul be *but* the ratio of the mixture?

This problem is made more difficult by the fact that Aristotle *does* believe the soul to be the λόγος of the body.⁴⁶ In *DA* 2.1, he argues that, just as the axe-hood (τὸ πελέκει εἶναι) of an axe serves as the λόγος and substance of an axe, and just as the capacity of sight (ὄψις) serves as the λόγος and substance of an eye (ὀφθαλμός), so also is the soul the λόγος and substance of the whole living body.⁴⁷

⁴⁵ For Aristotle, flesh cannot be flesh without the capacity for touching (i.e. the ability to experience a tangible object as hot or cold, hard or soft, etc.). A general statement of this principle, and its application to flesh, is found at *Meteor.* 4.12, 390a10–15.

⁴⁶ Pace Baltussen (1996, 341).

⁴⁷ *DA* 2.1, 412b10–23.

Elsewhere, Aristotle even seems to assimilate Empedocles' understanding of a λόγος that defines elemental mixtures such as bone to his own doctrine of substance. At the end of *Metaph.* A.10, he writes:

Even Empedocles says bone to exist in a ratio (τῷ λόγῳ), but this is the 'what-it-is-to-be' (τὸ τί ἦν εἶναι) and the substance (οὐσία) of the thing. But then, similarly, it is necessary also either for flesh and the other things to be the ratio (λόγον), or for nothing to be; for because of this, flesh and bone will be, along with each of the other things, and not on account of the matter, which he calls fire and earth and water and air. But if these things would have been stated by someone else, he necessarily would have agreed with them, but he did not speak clearly. (*Metaph.* A.10, 993a17–24)

Given the closeness of the Empedoclean and Aristotelian conceptions of λόγος, how can Aristotle remain justified in holding the harmony theory apart from his own hylomorphic definition of soul?

The solution is that Aristotle thinks that a *geometrical* or *arithmetical* λόγος is distinct from the kind of λόγος that he himself identifies with the soul. Aristotle's λόγος is a *determinate essence* characterised by formal, efficient, and final causal powers that can be expressed in a linguistic formula. One can see this kind of λόγος expressed in the formulas Aristotle ascribes to the dialectician and the real natural scientist of *DA* 1.1. According to Aristotle, the sort of λόγος sought by natural scientists is not an arithmetical ratio that characterises a proportion of material stuffs, nor the spatial organisation and operation that characterises material magnitudes. Instead, it is the essence of a thing, i.e. its internal formal, final, and efficient cause.

That Aristotle would see this kind of λόγος as distinct from the harmony theorist's geometrical or arithmetical λόγος is to be expected. The harmony theorist, in virtue of understanding the soul as *only* a mathematical λόγος present in mixtures or the formal arrangement of the body, is, according to Aristotle, unable to show how the soul could be responsible for any particular *psychological* function in the body, as the demonstrative heuristic requires.⁴⁸

6.9 The Results of Aristotle's Criticism of the Harmony Theory

The harmony theory of soul, at first glance, does seem to be similar to Aristotle's hylomorphic psychology. I have tried to show why this appearance is misleading. By testing out the consequences that follow from

⁴⁸ Compare Aristotle's criticism of number-substance theories in, for example, *Metaph.* A.5, 985b23–986a13; *Metaph.* A.8, 989b29–990a32. Cf. Langton (2000).

this theory in accordance with the demonstrative heuristic, Aristotle shows that soul cannot be identified with an arithmetical or geometrical harmony determined by lower-level material processes and properties.

The mistake of the harmony theory is that it takes bodily compositions, mixtures, and powers, to be *necessary and sufficient* for the existence of soul and its affections and activities, just as a modern supervenience theorist or non-reductive materialist would. The truth, Aristotle thinks, is that such material conditions are *hypothetically necessary, but not sufficient*. This accords with Aristotle's hints that the soul's affections and activities are to be understood by analogy with a craft needing to be exercised with particular tools.

Since Aristotle is not an emergentist, he does not think elemental mixtures can produce – by purely mechanical or chemical means – a soul or a psychological power.⁴⁹ Thus, if the soul is a λόγος, Aristotle suggests, it must be of a different kind than what Empedocles and the harmony theorists thought. In particular, this λόγος must be a non-mathematical form, causally efficacious, and teleologically determined. This negative result places a constraint on him to deny that the soul is a mathematical ratio or form.

However, Aristotle also thinks that the harmony theory gets something right. Positively, the criticism of the harmony theory is the first place where Aristotle sees that the existence of (some kinds of) soul and body must be essentially interlinked, in a way that is consistent with the *Axiom of Causal Association*. The interconnection of the essence of flesh and the other bodily parts lends evidence to the idea that soul can plausibly be understood to be a formal entity within a living body that is distinct from the material mixtures that compose it, and something which needs the body as a necessary condition of its existence. These observations place a positive constraint on Aristotle to move towards adopting the *Hylomorphic Thesis*.

⁴⁹ In general, Aristotle holds that any given instance of a soul's generation in a material body is an instance that presupposes other ensouled beings (e.g. mother and father) transmitting psychological form to an embryo in virtue of the causal powers of *their* souls. Cf. *GA* 1.2, 716a4–7; *GA* 1.20, 729a9–12; *GA* 1.21, 729b18–21; Code (1987); Gelber (2010). I bracket here the more difficult issue of Aristotle's theory of spontaneous generation. Cf. Lennox (1982); Gortself (1989).

Empedocles' Psychology

For all of them suppose thinking to be bodily in the same way as perception, and that we both perceive and understand like by like.

Aristotle, *De Anima* 3.3, 427a26–29

7.1 Introduction

So far, I have discussed Aristotle's criticisms of earlier theories of soul that tried to offer principled explanations of the soul's ability to produce motion in the body. However, Aristotle also has major worries with theories of soul that he classifies as being oriented towards explaining the soul's power to cause thinking and perception.¹ He claims that all these cognitive theories of soul – with the exception of Anaxagoras' – assumed as a starting point the axiom that 'like cognises like'.² The thinkers who held these theories, according to him, reasoned that, since all beings are composed of basic elements, and since the soul can know all things, given that like cognises like, soul must itself be composed of the basic elements (whatever elements there might be). In order to criticise these theories, Aristotle will apply his demonstrative heuristic to see if such an understanding of soul can indeed explain its ability to cognise the world.

Although Aristotle ascribes this explanation of the soul's cognitive abilities to Diogenes of Apollonia,³ Heraclitus,⁴ Empedocles,⁵ Plato (in the

¹ See *DA* 3.3, 427a19–29, as well as *Metaph.* Γ.5, 1009b12–15, and the criticism of Laks (1999).

² The origins of this aphoristic principle are to be found in Hom. *Od.* 17.218. Cf. Guthrie (1962–1981, 2.228ff). On the application of the principle of like to like in non-epistemic contexts, see Mourelatos (2006, 62–3).

³ *DA* 1.2, 405a21–4.

⁴ *DA* 1.2, 404b25–9.

⁵ *DA* 1.2, 404b8–15.

Timaeus),⁶ along with certain Platonist thinkers referred to in his own *On Philosophy*,⁷ amongst whom is Xenocrates,⁸ I will focus here only on Aristotle's criticism of elemental soul theories in general, and Empedocles' elemental theory of soul in particular. I first discuss Aristotle's account of Empedocles' psychology (Section 7.2). I then analyse the scientific difficulties that Aristotle raises concerning the ability of element theories such as Empedocles' to explain the soul's power of cognition in virtue of the principle that like cognises like, which I call the *Cognitive Likeness Principle* (Sections 7.3–7.8). Finally, I show how Aristotle tries to resolve these difficulties by adopting a modified version of this axiom, which I call the *Refined Cognitive Likeness Axiom* (Section 7.9).

7.2 Aristotle's Account of Empedocles' Psychology

Empedocles of Acragas (ca. 495–435 BCE) is the first Presocratic thinker to have proposed that all objects in the world, including living beings, consist of four material 'roots' (ρίζωματα) – fire, air, earth, and water – existing in various states of combination and separation. Those states of combination and separation, he claimed, are the result of the operations of two primordial forces, Love and Strife, which bind and loose the elemental roots in regular cosmic cycles. These philosophical views come down to us in two hexameter verse poems, the *Peri Physios* (*On Nature*) and *Katharmoi* (*Purifications*), whose relationship and doctrinal unity is contested.⁹ Although neither poem sets out to give a theory of the soul as such,¹⁰ in *De Anima*, Aristotle purports to find within Empedocles' philosophy a materialist epistemology that implies one. He writes:

Those who looked to the fact that ensouled things can know and perceive the things which are (γινώσκειν καὶ τὸ αἰσθάνεσθαι τῶν ὄντων) identify soul with the principles [of those things]: those who posit many principles make the soul those principles,¹¹ while those who posit one principle make

⁶ *DA* 1.2, 404b16–18.

⁷ *DA* 1.2, 404b19–27.

⁸ *DA* 1.2, 404b27–30. Cf. Ross (1961, 206).

⁹ Cf. Kahn (1960); Barnes (1982, 495–501); Osborne (1987a). For an overview of the problem, see Warren (2007, 135–7).

¹⁰ Indeed in the extant fragments we possess, including the recently discovered Strasbourg papyrus, Empedocles uses the term ψυχή but once, in DK31 B138 = TEGP 199[F144]: χαλκῶι ἀπὸ ψυχῆν ἀρύσας. See Martin and Primavesi (1998) and Osborne (2000). This would not be enough to ascribe a psychology to him, even if, contrary to common scholarly opinion, this term meant more than 'life'. Cf. Barnes (1982, 448).

¹¹ I retain ταύτας, following the punctuation of the OCT and explanation of Rodier (1900, 54).

the soul that principle, just as Empedocles makes a soul out of (ἐκ) all the elements, but also each individual element a soul (εἶναι δὲ καὶ ἕκαστον ψυχὴν τούτων), when he says:

*By Earth we see (ὁπώπαμεν) Earth, by Water Water,
by Air bright Air, but by Fire destructive Fire,
Love by Love, and Strife by baneful Strife.*¹²

And in the same manner, even Plato in the *Timaeus* makes the soul out of the elements.¹³ For he says that like is known by like (γινώσκεισθαι γὰρ τῷ ὁμοίῳ τὸ ὅμοιον), and that things are constituted from the principles (τὰ δὲ πράγματα ἐκ τῶν ἀρχῶν εἶναι). (*DA* 1.2, 404b7–18)

Care is needed in interpreting these remarks. When Aristotle claims that Empedocles makes the soul the elements, he is offering an interpretation of what is implied by Empedocles' poetic fragment. What is implied, he thinks, is that soul is made from the four elemental roots, along with Love and Strife, because these principles are described as causing (what Aristotle takes as) one of the soul's *per se* attributes – being productive of perception.¹⁴

Thus, we need not interpret Aristotle as offering a *historical* thesis about how Empedocles deduced his view of the soul. Rather, he is offering an interpretation of what philosophical view is implied by Empedocles' poetic claims. The axiom that Aristotle thinks is implied here is what I shall call the *Cognitive Likeness Principle*. This principle can be formulated as follows:

Cognitive Likeness Principle =_{def} For all *x* and for all *y*, *x* is naturally capable of cognising *y* iff *x* is like *y*.¹⁵

Since the term ὅμοιον ranges in meaning from 'similar' to 'same',¹⁶ the axiom admits of either a broad interpretation (for example: dogs are like chairs because they are *similarly* four-legged), or a narrow interpretation (for example: dogs are like dogs, because dogs are the *same* kind of animal).

¹² DK31 B109 = TEGP 158[F110].

¹³ On his reasons for thinking that Plato made the world soul from elements, see Carter (2017).

¹⁴ See DK31 B105 = TEGP 163[F115]; DK31 B107 = TEGP 165[F117]; DK31 A86 = TEGP 168. Kahn (1960, 14), in support of Aristotle, relying on the evidence of DK31 B103 = TEGP 162[F113] and DK31 B110 = TEGP 22[F5], argues that Empedocles is committed to a 'rigorous panpsychism', and that consciousness in Empedocles is a general feature of all the elements. He is followed by Guthrie (1962–1981, 2.233). However, cf. Barnes (1982, 481–5).

¹⁵ *DA* 1.2, 404b17–18.

¹⁶ See LSJ (1940), *s.v.* ὅμοιος.

Nevertheless, on either kind of interpretation, it is the sameness that obtains between cognisor and cognised that does the explanatory work.¹⁷ For Aristotle, being *the same as something in some respect* (either broadly or narrowly) is a necessary and sufficient condition for being *like* that something.¹⁸

Aristotle thinks that Empedocles and other elemental soul theorists, whether they recognised it or not, are committed to a certain conception of the soul in virtue of holding the *Cognitive Likeness Principle* along with an element-based ontology. This is because he claims that these thinkers interpreted this principle as applying primarily to the likeness that holds between the *basic elements* within their ontology.

Thus, using the demonstrative heuristic, we can see that Aristotle casts these theorists as having offered the following explanation of the soul's ability to cognise:

1. [A] Being able to cognise belongs_{per se} to [B] being alike in elemental composition.
2. [B] Being alike in elemental composition to all things belongs_{per se} to [C] soul.
3. [A] Being able to cognise all things belongs_{per se} to [C] soul.

Whilst this is a neat deduction, is Aristotle justified in interpreting DK31 B109 = TEGP 158[F110] as implicitly advancing this argument? Answering this question is important, for if the answer is a hard 'no', it is difficult to defend the idea that Aristotle is seriously concerned with testing out Empedocles' psychological theory. Kirk, Raven, and Schofield, for instance, point out that ὁπώπαμεν in this passage, taken with the instrumental dative (i.e. *by* earth, *by* water, etc.), does not imply that the individual elements perceive, but rather, that *we* (the collective cognitive subject) perceive *by means of* these elements (which are different from the cognitive subject).¹⁹

However, we can accept this point without rejecting Aristotle's interpretation. First, Empedocles claims in at least two places that everything that exists has mind.²⁰ Second, although this fragment does not say that the elements themselves perceive, we must assign the implicit cause of Empedoclean

¹⁷ Plato nicely explains how likeness reduces to sameness in *Rep.* 4, 435a5–8.

¹⁸ Lloyd (1966, 434) argues that, in early Greek thought generally, 'the relationship of similarity tends to be assimilated to that of complete identity'.

¹⁹ KRS (1983, 311).

²⁰ DK31 B103 = TEGP 162[F113]; DK31 B110 = TEGP 22[F5].

perception to either (A) the whole living being with sense organs, (B) the organised nature of the sense organs, (C) the nature of the six elemental beings, or (D) some non-elemental thing within an elemental composite.²¹

Under the assumption that Empedocles held a psychology consistent with his natural philosophy, unless we follow Aristotle's speculative suggestion that he might implicitly be a harmony theorist, option (D) is a non-starter. It is (relatively) uncontroversial that one of Empedocles' main goals in his poem(s) is to explain the origination of all beings from the four roots in combination with the forces of Love and Strife. It would be exceedingly odd to ascribe to him the idea that the ultimate subject of perception is a ghostly being that floats free of his natural philosophy.²²

Option (B) provides a more plausible interpretation. It emphasises that, outside of DK31 B109 = TEGP 158[F110], Empedocles often explains perception by appealing to the structure of the sense organs, not just their elemental composition. We see this, for instance, in Empedocles' account of the construction of the eye.²³ According to it, the formula 'we perceive *F* by *F*', should be understood to carry roughly the same meaning as, 'we perceive fire by *eyes* composed of fire'. In this sense, the fire by which we perceive fire, for example, will refer to fire-within-an-organised-sense-organ.

In further support of this option, outside of the fragments, there is a doxographical tradition purporting to represent the mechanics behind Empedocles' explanation of perception. Theophrastus reports that Empedocles held that, within the sense organs, there are various channels (πρόροι) – obliquely referred to in DK31 B3 = TEGP 21[F4] – which are set up to receive effluences (ἀπορροαί) from external objects.²⁴ If those sense

²¹ For a very different view, cf. Kamtekar (2009).

²² For this reason, it has proven difficult to identify the *daimon* of the *Katharmoi* within Empedocles' elemental schema. Scholars have suggested a variety of possibilities. Some argue that Empedocles' *daimon* is a being that falls outside of the elemental schema of the *Peri Physios*. This is the view of Cherniss (1935, 294), who claims that Empedocles' soul 'stands apart from [the elements] as consciousness', and Darcus (1977, 187). Others, such as Kahn (1960, 14–22, 38), and O'Brien (1969, 325–36), argue that it should be identified with a particle of the element of Love. For a critical view of this suggestion, cf. Osborne (2000, 343). Others, such as Barnes (1982, 500), claim it to be a particulate mixture of all the elements in some combination. Still others, such as Primavesi (2008), argue that it is an allegorical description of the supra-personal elements in their pure states. For an excellent discussion of Empedocles' *daimon* see Warren (2007, 146–52), and for a persuasive account of its place in Empedocles' physics see Trépanier (2014). Although Aristotle does not ever refer to Empedocles' *daimon*, most of the above interpretations of it are in fact modified versions of the logical options that Aristotle himself charts out with respect to interpreting Empedocles' doctrine of soul. See Chapter 6, Section 6.7. This suggests that Aristotle was keenly alive to the difficulty of reconstructing Empedocles' psychological views.

²³ DK31 B84 = TEGP [F105].

²⁴ *Men.* 76c4–d5 = DK31 A92 = TEGP 155.

channels are in perfect alignment (σύμμετρος) with such effluences, and are composed of the same elemental stuff as those effluences (for example, a fire channel aligned with incoming fire effluences), then whenever the requisite effluences enter into a sense channel, perception naturally occurs.²⁵

In the case of Empedocles' theory of sight, for instance, Theophrastus tells us that, in the eye, fire and water channels alternate. The fire channels receive fire effluences by which we recognise white colour (or brightness), and the water channels receive water effluences by which we recognise black colour (or darkness).²⁶ The proportional amounts of these two kinds of effluences, distributed throughout the eye as a whole, seems to be the explanation of the unified appearance of mixed colours – just as a mixture of basic paint colours produces a non-basic colour.²⁷

From this account of the sense organs, one might easily conclude that Empedocles thought that it is the sense organ *as an organised whole*, and especially its structural features, that is essential to the explanation of our capacity for perception.²⁸ Under this interpretation, DK31 B109 = TEGP 158[F110] does not imply that the *soul* is an elemental composite that perceives on the basis of the likeness principle, as Aristotle claims. Rather, this fragment is a shorthand and poetic way of saying that we use our *organised* sense organs, each of which is characterised by the predominance of some element in the sense channels, as *instruments* of perception. On this reading of Empedocles, it is structured material, not material alone, that explains perception.

The problem for this reading is that Aristotle is of course aware of Empedocles' structural claims about the sense organs. In fact, he is our source for the fragment describing Aphrodite's (or Love's) construction of the eye.²⁹ Why then in *DA* 1.2 does he ignore these structural features and suggest that Empedocles accounted for the soul's power of perception by means of his elements and the likeness principle alone?

A plausible explanation is that, although organisation and proportion play an explanatory role for Empedocles in the production of the

²⁵ DK31 A86 = TEGP 168. As Long (1966, 260), notes, these effluences appear to be tiny particles that constantly stream off objects in a manner similar to Democritus' εἶδωλα. Cf. Ierodiakonou (2005, 23–34).

²⁶ Theophr. *De Sensibus* 7 = DK31 A86 = TEGP 168. Aristotle, however, thinks that Empedocles may be committed to both an (active) emission theory of perception, and a (passive) effluence theory of perception. See *Sens.* 2, 438a4–5; Johansen (1997, 51–5).

²⁷ DK31 B71 = TEGP 150[F101]; DK31 B23 = TEGP 47[F24]. See Ierodiakonou (2005, 33).

²⁸ See Long (1966, 262), who notes that, 'perception occurs when ἀπορροαί are received by the sense-organs *as distinct from other parts* of the body' (italics mine).

²⁹ Cf. *GC* 1.8, 324b26–35 = DK31 A87 = TEGP 169.

perception of *blended objects* (such as colours mixed in a certain ratio), as interpretation (B) holds, these features do not appear to explain the *capacity of perception itself*. The organisation of the sense organs merely *limits* the types of objects that the *already-perceptive* sense organs can receive.

The real explanatory work is done, as interpretation (C) holds, by the *Cognitive Likeness Principle*. This axiom, as Aristotle rightly sees, explains what happens *within* the elemental channels inside the sense organs. Whilst the structure of the sense organs puts geometrical constraints on what elemental effluences can be received by the different senses, it is the elemental sameness in kind between the elemental *constituents* of the sense organs and their corresponding effluences that is the fundamental explanation of why perception occurs once the elemental particles are received into the sense channels. Thus, interpretation (C) provides the most fundamental philosophical reason for why Empedoclean perception is able to occur. If so, then Aristotle's claim that Empedocles makes the soul to be the elements is a justified, even if imprecise, way of claiming that the latter's theory of perception reduces the soul, as an *explanans* of perception, to the material elements in sense organs *qua* material elements, operating in accordance with the likeness principle.

However, what about option (A)? Is it plausible to claim that Empedocles thinks that perception can be explained by appealing to the nature of a whole living being using its sense organs? This is a natural way of interpreting the fragment, and it is consonant with Empedocles' acceptance of the idea that there are (perishable) composite beings,³⁰ – birds, fish, and humans, for instance – which he represents as beings distinct from the elements that compose them, even if they can be reduced for the purposes of scientific explanation to their fundamental elements.³¹

Strictly speaking, Aristotle already takes this interpretation into account. This is because he claims that Empedocles *both* makes soul (in the singular) out of all of the elements (plural) – which is equivalent to making a composite being the subject of perception – *and* identifies each of the elements in isolation as a soul.³² By this logic, option (A) – at least, according to Aristotle – is the additive result of combining all the perceptive elements in option (C).

³⁰ *Metaph.* A.3, 984a8–11 = DK31 A28 = TEGP 28.

³¹ DK31 B8 = TEGP [F32]; DK31 B17 + Strasbourg Papyrus a(i) + a(ii) = TEGP 41[F20]; DK31 B21 = TEGP 45[F22]; DK31 B22 = TEGP 46[F23]; and especially, DK31 B23 = TEGP 47[F24].

³² Cf. *GC* 2.7, 334a9–15, which argues that the soul can *neither* come from *one* Empedoclean element (e.g. fire), *nor* from *all* the elements mixed together. On this passage, see Chapter 6, Section 6.4.

To really challenge Aristotle's interpretation, one would need to defend the idea that compositional complexity or organisation itself suffices to explain the capacity for perception. However, to do so would require a sophisticated understanding of whole-part relations that does not seem to be available in Empedocles.³³ Even if he understood the proper subject of perception to be a composite whole that 'uses' the sense organs or their elements as instruments of perception, he would still need to explain why it is that wholes, but not their parts, perceive the world.

7.3 The Epistemic Limitations of 'Like Cognises Like'

Aristotle's interpretation of Empedocles' psychology is thus consistent with, and a plausible interpretation of, the available fragments from his works, as well as the doxographical testimonies we have about his psychology. How does this theory of soul fare in respect of the demonstrative heuristic? Aristotle writes:

But many difficult puzzles hold for those who say with Empedocles that we know with the bodily elements (τοῖς σωματικοῖς στοιχείοις), that is, by being related to something that is like them (πρός, τὸ ὅμοιον), as can be witnessed from what now is said; for all the parts of the bodies of animals that are simply (ἀπλῶς) of earth,³⁴ such as bones, sinews, and hair, seem not to perceive anything, and so neither perceive their like, as indeed they ought to. But moreover, to each of the first principles there will belong more ignorance than comprehension; for on the one hand each element will know one element like it, but, but many elements it will not know, namely, all the others. It follows, for Empedocles at least, that his God is the most unintelligent being, for he alone will not know one of the elements, namely, Strife, but mortals can know all the elements, for each mortal thing is composed of all of them. (DA 1.5, 410a27–b7)

Aristotle offers two arguments here against Empedocles, and those who follow him, for affirming a materialist theory of cognition based upon the *Cognitive Likeness Principle*. The first argument is empirical. His claim is that the parts of living bodies that consist of earth³⁵ do not in fact perceive their like. Hair, for instance, which is earthy, neither perceives hair, nor

³³ See Cherniss (1935, 399).

³⁴ Aristotle's claim about bones and hair being non-perceptive is repeated at DA 3.13, 435a25.

³⁵ Since Aristotle has just cited Empedocles' claim that bones (ὀστέα) are produced from a ratio of earth, fire, and water (DA 1.5, 410a4–6), he must be appealing here to his own mixture theory, as Empedocles' account not only cannot support bones being earth *simpliciter*, but would also have bones turning out to be more fire-like than earth-like.

does it perceive earth. Because hair is composed of *some* element, it should at least be able to perceive *something* like itself.

Notably, Aristotle's second argument represents the *only* argument in *DA* 1 that the Greek commentators were willing call 'dialectical'.³⁶ It charges that Empedocles' *Cognitive Likeness Principle* has the undesirable consequence that his God will have more ignorance than knowledge. The argument is directed against Empedocles' description of God as the divine Sphere³⁷ produced in the age of Love when Strife has been expelled from the cosmos.³⁸ Aristotle is correct that Empedocles represents the Divine Sphere as a unified mixture of all the elements apart from Strife. However, it is not clear whether he is committed to the idea that this Sphere knows all things (or all kinds of things), or whether Aristotle is citing a common opinion that God is the sort of being to know all things (or at least, know more than mortals).³⁹ In any case, Aristotle's basic problem is that, if Empedocles is right that all things perceive based on likeness, then he must also accept that his God, in principle, knows fewer things than mortals, since his God will not be able to perceive Strife.

7.4 The Likeness Principle and Panpsychism

Aristotle's larger worry with the application of the *Cognitive Likeness Principle* concerns its universal scope. He claims that this principle does not offer us a way of dividing the realm of living beings from the realm of non-living beings. He writes:

In general, what is the explanation (διὰ τίν' αἰτίαν) of the fact that not all beings have soul, since every being is either an element, or composed from one, many, or all of the elements? For necessarily (ἀναγκάσθων) [by the principle that like cognises like], every being knows one element, or some, or all. (*DA* 1.5, 410b7–10)

Aristotle's charge is that, because Empedocles ascribes knowledge and perception to the elements based on an unrestricted likeness principle, it seems that *any* combination of elements, as well as each element in

³⁶ See Chapter 1, Section 1.2.

³⁷ DK31 B28 = TEGP 56[F31]; DK31 B31 = TEGP 60[F35]. In *Metaph.* B.4, 1000a28, Aristotle refers to Empedocles' Sphere as the 'One' (ἓν).

³⁸ DK31 B35 = TEGP 51[F28]; DK31 B36 = TEGP 52[F29]. Cf. *DC* 3.2, 301a14–15.

³⁹ The latter is Alexander's interpretation *apud* Philop. (*In de anima*, 182.11–14). Aristotle repeats this argument at *Metaph.* B.4, 1000b3–8. Cf. *Metaph.* Λ.9, 1074b24–6, where divine νοῦς is said not to think of *all* things, but only the most divine (θειότατον) and honourable (τιμιώτατον) ones.

isolation, will be able to perceive like elements. If so, then every element and every composition of elements can be predicated with ‘having a soul’, unless there is good reason to restrict the principle’s scope.

In one way, this argument assumes what it means to prove. If Empedocles did think that an unrestricted version of the likeness principle holds, then he can happily admit that every being *does* have a soul in virtue of having elemental parts, which would be consistent with his claims that everything has mind. Moreover, he can also admit that these elemental parts also have souls. How then is Aristotle justified in assuming some things do *not* have soul?

The answer can be found by turning again to the structure of the demonstrative heuristic. Aristotle sets up his inquiry into the soul by assuming, along with most his predecessors, that it is a basic *explanandum* of psychology that some beings are alive, and others are not.⁴⁰ The task of his psychological inquiry is to discover a definition of soul that will help to explain those of its features associated with the distinction between living and non-living things, namely, motion and perception (and later, nutrition). From this methodological perspective, if Empedocles denies that there are any soulless beings, then he would not be engaged in the same scientific inquiry as Aristotle.⁴¹

7.5 The Likeness Principle and Cognition of Opposites

Aristotle also has another objection to Empedocles that questions the need to assume that each element can perceive *only* its actual like.⁴² As we shall see, this argument will open up a path for modifying Empedocles’ *Cognitive Likeness Principle*. He writes:

But if it is necessary (δεῖ) to make the soul from the elements, nothing makes it necessary that it be from all of them. For one part of a pair of opposites (ἐναντιώσεως) suffices to discriminate (κρίνειν) itself and also what is its natural correlate (ἀντικείμενον).⁴³ For we recognise by means of what is straight both it and what is bent. For a ruler (κάνων) is able to judge (κριτῆς) both, but the bent thing neither itself nor the straight thing. (DA I.5, 411a2–7)

⁴⁰ See Chapter 1, Section 1.3.

⁴¹ See Sedley (2007, 7), who notes that the Presocratics would have thought that the more fundamental problem is to explain why some things seem to be *inanimate*. Cf. DA I.2, 403b25–7.

⁴² This argument, which Ross brackets, does not make sense in the received manuscript location, the context of which does not concern cognition.

⁴³ On the relationship between Aristotelian ἐναντία and ἀντικείμενα, see Judson (2018, 131–2).

Aristotle here relies upon his thesis that, in some cases, if one can discriminate some positive predicate ('being hot', or 'being straight'), one will also be able to discriminate, in some informative sense, opposite privative predicates (e.g. 'less hot/cold', 'less straight/bent') in other objects.⁴⁴ This is because Aristotle takes the grasp of a positive predicate to be a standard measure for judging predicates within the same category that are privations of it, in the sense of falling short of the measure.⁴⁵

There is also a priority claim here. Aristotle claims that if one knows that a line is straight, one can judge the extent to which another line is 'less straight', in the informative sense of being crooked. However, he does not think that our discriminatory abilities run in the opposite direction. This is because there is only one way to be straight, and an infinite number of ways to be crooked. Thus, 'being crooked' is not determinate enough to provide a measure for how straight something is.

Despite the *prima facie* defensibility of this argument, it does not suffice as a refutation of the likeness principle. At most, it shows that the likeness principle does not commit Empedocles to the thesis that the soul is made of *all* the elements, and that he might need to modify it to accommodate other features granted to belong to the soul's cognitive ability, such as its ability to recognise privations. This strongly suggests that, in certain scenarios, *unlike* things are able to cognise one another, and hence that the *Cognitive Likeness Principle* cannot be true without qualification.

This argument is connected to another problem. In *DA* 3.3, Aristotle argues that the *Cognitive Likeness Principle*, as used in earlier materialist explanations of cognition, does not facilitate an explanation of the epistemic state of being in error:

But since, in the main, it is by two differentiae (διαφοραῖς) they attempt to define (ὀρίζονται) the soul – by motion with respect to place, and by thinking (νοεῖν) or understanding (φρονεῖν) or perception (αἰσθάνεσθαι) – it seems that thinking and understanding are just a kind of perception (for in both of these the soul distinguishes (κρίνει) and cognises (γνωρίζει) something of beings, and certainly the ancients said that to understand and to perceive are the same (τὸ φρονεῖν καὶ τὸ αἰσθάνεσθαι ταὐτὸν εἶναι) – just as Empedocles said, 'For with respect to what is present wisdom increases for men', and in other places, 'from whence to him thinking was always presenting different things', and the same is meant also by Homer saying 'of such is the mind of men', for all of them supposed thinking (τὸ νοεῖν) to be bodily just as perception (τὸ αἰσθάνεσθαι), and that we perceive and

⁴⁴ Cf. *NE* 5.1, 1129a17–26.

⁴⁵ Cf. *Top.* 1.10, 104a15–17.

think what is 'like by what is like', just as we laid out in the things we said at the outset (ἐν τοῖς κατ' ἀρχὰς λόγοις); and yet they ought to have at the same time said something concerning error, for this is more proper to animals, and the soul spends most of its time in this state. For this reason it is necessary either that (as some of them said) all the appearances are true (πάντα τὰ φαινόμενα εἶναι ἀληθῆ), or that error comes about from contact with what is unlike, for this is opposite to the case of knowing like by like. (DA 3.3, 427a17–b5)

Here, Aristotle argues that, since earlier psychological theorists were in general committed to the *Cognitive Likeness Principle*, they must all also hold either that (P1) all appearances are true, or that (P2) error in cognition is the result of the soul's (or something in the soul) coming into contact with something unlike it. We have already seen that Aristotle thinks that Democritus holds a relativistic version of (P1),⁴⁶ which, although compatible with the objective truth of atomism, does not seem able to explain our knowledge of atomism itself. What of (P2)? To this claim Aristotle objects:

But it seems that both knowledge and error of opposites (ἐναντίων) is the same. (DA 3.3, 427b5–6)

Aristotle's reasoning here is obscure. His claim seems to involve both his belief that knowledge of one positive opposite in a pair of opposites brings with it a capacity to discern the other opposite (or something related to it, such as its privation), as well as a new observation about error. The problem seems to be this: if we truly cognise that 'S is P' when our souls (in virtue of their elemental structure) are *like* P, and we falsely cognise that 'S is P' when our souls are *unlike* P, our true and false epistemic states will be phenomenally indistinguishable.

For example, assume that souls consists of fire particles. Then, when your soul comes into contact with *water particles* originating from some S that are *unlike* it, it may make the *false* judgement that 'S is fire'. However, according to the same model, when your soul comes into contact with *fire particles* from some S that are *like* it, it would make the same judgement, albeit this time *true*, that 'S is fire'. This implies that, on a like-by-like/unlike-by-unlike model of true/false cognition, there is no way to determine whether we are judging truly or judging falsely in any given case of perception or thinking.

Aristotle will use this worry to develop a more nuanced theory of error, which is a sort of compromise between (P1) and (P2). According to this

⁴⁶ See Chapter 4, Section 4.4.

theory, the perception of each of the special objects of the five senses is always true, as Democritus held (e.g. I am perceiving white), and perceptual error is the result of wrongly assigning a truly perceived property (e.g. white) to an object which possesses an property 'unlike' the property truly perceived (e.g. I am wrongly perceiving x to be white, when x is in fact yellow).⁴⁷ Aristotle also makes a distinction between the special objects of the senses, and their common objects, and suggests that the perception of common perceptible properties that can be perceived by multiple senses (e.g. states of motion and rest, shape, and number and size) are both perceived inaccurately, and can be wrongly ascribed to objects that possess common properties 'unlike' the ones we perceive.⁴⁸

7.6 A General Criticism of Elemental Psychology

Aristotle also uses his worry about Empedocles' *Cognitive Likeness Principle* to make a criticism of elemental soul theories in general. He writes:

While they say [that the soul is composed of the elements] in order that the soul can perceive and have knowledge of everything that is, there are many absurdities involved in this account. For they posit that the soul cognises like by what is like (τῷ ὁμοίῳ τὸ ὅμοιον), just as if the soul were posited as being the things [it cognises] (ὥσπερ ἂν εἰ τὴν ψυχὴν τὰ πράγματα τιθέντες). But the elements are not the only things that exist, since there are a great number of other things – or rather perhaps an infinite number⁴⁹ – made from the elements (τὰ ἐκ τούτων). Let it be granted that each of these things are from the elements, and that the soul cognises and perceives [like by what is like]; yet by what element will soul cognise and perceive the compound (τὸ σύνολον) itself, such as what God or man or flesh or bone is? This problem holds similarly in regard to whatever else is combined (συνθέτων). For it is not the elements holding in any way whatsoever that compose things, but the elements holding in a certain ratio and composition (λόγῳ τινὶ καὶ συνθέσει), just as Empedocles also says about bone:

*But then in broad-chested hollows
pleasant Gaia receiving two parts of eight
from gleaming Nestis, and four from Hephaestus,
came bones, being all white.*⁵⁰

⁴⁷ DA 3.3, 428b18–22.

⁴⁸ DA 2.6, 418a16–19.

⁴⁹ Cf. SE 1, 165a10–12, where Aristotle deduces that names, as well as accounts, must signify many things, since they are finite in number, while 'things are infinite in number'.

⁵⁰ DK31 B96 = TEGP[F69].

So it is not useful for the elements to be in the soul, unless the ratios and the composition will be in it as well. For each element will know its like, but none will know bone or man, unless those things will be in it as well. Against this, because it is impossible, it is not necessary to say anything. For who would puzzle over the question of whether there is a stone or man in the soul? Similarly, this applies to what is good and what is not good; and in the same way, to other things. (*DA* 1.5, 409b24–410a13)

Aristotle's criticisms apply both to theories of the soul that posit 'corporeal' (σωματικός) elements,⁵¹ like that of Empedocles, and to theories like those proposed in the *Timaeus*, and by Speusippus and Xenocrates, which posit incorporeal (ἄσωματός) elements, interpreted as mathematical principles that are ontologically prior to (in the sense of causing the existence of) bodies.⁵²

As a general challenge for elemental accounts of cognition, Aristotle offers a dilemma: either an element-based theory of perception cannot account for the scope of our knowledge, or, it entails absurd consequences about the kind of things our souls are composed of. To show why, he begins by assuming the truth of the *Cognitive Likeness Principle* in order to see how it fares with respect to accounting for our recognition of composite objects (e.g. fish, birds, humans). This challenge is a serious problem for all elemental soul theorists, materialist or otherwise. If *every* object in the world is composed of one or more fundamental elements, how will a cognisor or perceiver know these objects as complex unities rather than as a series of separate elemental parts?

For example, if one is an Empedoclean psychologist, in virtue of what will a cognisor distinguish between the particles of fire arriving in their sense organs that compose *bone*, and the particles of fire arriving in their sense organs that compose *flesh*?⁵³ Aristotle's suggestion is that, unless there is a special element in the soul that can see the composite whole in its unity, there will be no way for an elemental soul to perceive composite objects. Instead, it will only perceive the individual (material or immaterial) elements within those composites.

Aristotle alleges that elemental soul theories have only one way to account for our knowledge of composites: they must admit that every ratio and composite whole will literally have to be in (or part of) the soul. Empedocles is particularly vulnerable to this objection, because the ratios

⁵¹ Cf. *DA* 1.5, 410a28.

⁵² Cf. *DA* 1.2, 404b16–32.

⁵³ See Beare (1906, 14).

that define his composites supervene upon, and hence are inseparable from, the quantity of the basic elements going into a composition. It is the ratio of two-parts-of-water: four-parts-of-fire, not 2:4 *simpliciter*, which defines an Empedoclean compound.⁵⁴ However, it would be difficult for Xenocrates to answer as well, since knowing the numerical essence of a thing (e.g. that it imitates the Form-number Four, and thus is a solid) is not sufficient to distinguish between bones and humans.

However, there is a way out of this dilemma. Aristotle does not suggest here that it is impossible, or even unreasonable, for a separable, non-supervening and non-mathematical ratio, to be in the soul. This leaves open the possibility that, if the ratios of composites can somehow be in the soul *apart* from the elements (e.g. as a conceptual entity), and if such ratios are sufficient to determine the identity of compounds, then the soul might indeed perceive composites without itself being an elemental compound. I argue below that, although Aristotle thinks that *mathematical* ratios are not sufficient to determine the identity of composite substances,⁵⁵ his objection leaves open the idea that soul might perceive in virtue of possessing (or coming to possess) an object's formal determination (λόγος), in the sense of its non-corporeal formal features, such as its essence, quality, quantity, etc.⁵⁶

7.7 A Categorical Criticism of Elemental Soul Theories

Aristotle also criticises elemental soul theories for their inability to explain our knowledge of the 'categories' of being. The categories of being, according to Aristotle, are the ultimate kinds of entities that the term 'being' (τὸ ὄν) signifies. These are claimed to be ten in number in the *Topics*.⁵⁷

Aristotle's categorical theory of being holds that, when we form a simple proposition in natural language (e.g. 'S is P'), the copula 'is' in our proposition linked to the predicate P will refer to a certain kind or mode of being, either (1) a 'what' or substance, (2) a 'how much' or quantity, (3) a 'sort' or quality, (4) a relation, (5) a where, (6) a when, (7) a position,

⁵⁴ This is why Aristotle emphasises that perception will not occur unless the ratios *and* the composition are in the soul (εἰ μὴ καὶ οἱ λόγοι ἐνέσονται καὶ ἡ σύνθεσις) (*DA* 1.5, 409b8). That Aristotle thought of Empedoclean ratios as essentially tied to the material they characterise is made clear in *Metaph.* N.5, 1092b17–21. See Hussey (2006, 24–6).

⁵⁵ This is because any such definition would be both (a) too broad, as capturing too many objects, and (b) too thin, insofar as it would contain only mathematical content.

⁵⁶ See Chapter 6, Section 6.8.

⁵⁷ *Top.* 1.9, 103b20–104a2.

(8) a state, (9) an acting, or (10) a suffering.⁵⁸ Aristotle draws attention to this metaphysical commitment at the outset of *De Anima*, when says that one question psychology should answer is what category of being the soul falls under.⁵⁹

However, rather than arguing that elemental theories of soul fail to identify what category of being the *soul* falls under, as we might expect, Aristotle gives a cleverer argument that purports to show that these theories of soul cannot explain our knowledge of the categories. He writes:

Still, since being (ὄντος) is said in many ways (for it signifies either some particular (τόδε τι), or some quantity (ποσόν) or quality (ποιόν) or some other of the categories (κατηγοριῶν) that have been determined), is soul made from all of them or not? But there do not seem to be elements (στοιχεῖα) common (κοινά) to all of these categories. So is it the case that the soul is made only from as many of them as are elements of substantial beings (οὐσιῶν)? So how will it cognise each of the others? Alternatively, will they say that for each genus (ἐκάστου γένους) there are elements and particular principles (ιδίως ἀρχάς) out of which the soul has been composed? Then it will be a quantity and a quality and a substance. But it is impossible that from the elements of quantity there comes to be a substance (οὐσίαν) and not a quantity (μὴ ποσόν). But for those who do say it to be from all of them, both these consequences and others of a similar sort result. (*DA* 1.5, 410a13–22)

There are two things to note here. The first is that Aristotle's argument presupposes that the kind of thing that the soul is still remains unknown. Thus, his suggestion that soul is made of the elements of substantial beings should not be confused with the claim that the soul *is* a substance. The second is that his criticism is not directly aimed at Empedocles. Even at his harshest, it is implausible that Aristotle would have faulted him for being unaware of a categorial schema in which 'being' (τὸ ὄν) figures as a homonym with multiple significations,⁶⁰ much less for neglecting to explicitly theorise about our ability to know these different significations using the *Cognitive Likeness Principle*. Based on similar criticisms of elemental theories of being in the *Metaphysics*, most of which are aimed at Platonic views, it is likely that Aristotle's primary targets here are Platonist elemental theories of being, such as that of Xenocrates.

⁵⁸ Cf. *Cat.* 4, 1b25–7. Categorial theories of being have been extremely important in the history of metaphysics and philosophy of mind. See, for instance, Kant, *CPR* A79–80/B105–6; Ryle (2002, 16ff); McDaniel (2009).

⁵⁹ *DA* 1.1, 402a23–5.

⁶⁰ Cf. *Metaph.* Γ.2, 1003b5; *Metaph.* Δ.7, 1017a22–7; *Metaph.* Δ.28, 1024b9–16; *Metaph.* E.2, 1026a33–1026b1; *Metaph.* Z.1, 1028a10–15; *Metaph.* Θ.1, 1045b33–4; *Metaph.* Θ.10, 1051a34–5.

How fair is this criticism? Although it might appear that Aristotle is merely stipulating that there cannot be elements common to all categories of being, in *Metaph.* Λ.4,⁶¹ he purports to give an argument that shows why, of necessity, there cannot be. The argument is that, to be an element is (i) to be prior to and (ii) not identical with, things that are composed from elements. However, since there are no elements that are both prior to and not identical with all the categories of being, there are no elements common to all categories of being.

For example, suppose with Aristotle that substance and quantity are two categories of being. To say that they have a 'common element' would be to say that each is made of at least two unknown elemental factors, and that one of these factors is common to both. For example, the category of substance might be composed of elements *E* and *P*, while quantity might be composed of elements *E* and *Q*. In this case, *P* and *Q* would be non-common elements, and *E* would be the common one. However, Aristotle thinks that there are no plausible candidates for *E* shared across the categories of being. He also confirms elsewhere that at least some of the categories, such as 'doing' and 'suffering', are unable to be explained by reference to elements at all,⁶² and that some categories, such as 'relation', depend upon others, such as quality (e.g. 'brighter than') or quantity (e.g. 'more than'),⁶³ and not on their own elements.

Another reason for thinking that there are no elements common to the categories of being is that one could ask if the elements, *E*, *P*, and *Q*, that (hypothetically) compose substantiality and quantity, are 'beings'. If the answer were 'yes', then this would be an additional way that being could be categorised, and hence we would have to add these ways of being to Aristotle's ten category scheme, making thirteen categories. If one could say the same of the elements of *all* the categories, this would mean that a new list of categories would be required to exhaustively derive or explain away all of the ten categories that Aristotle proposes.

Aristotle also mentions another option: that each category of being has its own peculiar principles. His problem with adopting this position seems to be that it entails a basic conceptual or linguistic confusion. Soul, it seems, in virtue of being composed of all the peculiar elements of each peculiar category of being, will also be a *member* of each category of being.

⁶¹ *Metaph.* Λ.4, 1070a31–b10.

⁶² Cf. *Metaph.* A.9, 992b18–993a10.

⁶³ Cf. *Metaph.* N.1, 1088a22–34.

The problem with this is that ‘soul’ would be a meaningful and intelligible answer to all of the following questions: Q: ‘What is it?’ A: ‘Soul’; Q: ‘Of what quality is it?’ A: ‘Soul’; Q: ‘How many is it?’ A: ‘Soul’; Q: ‘How are they related?’ A: ‘Soul’; Q: ‘Where is it?’ A: ‘At/in soul’; Q: ‘When did it occur?’ A: ‘At/during soul’; Q: ‘What state is it in?’ A: ‘Soul’; Q: ‘What is it doing?’ A: ‘Soul’; Q: ‘What is it suffering?’ A: ‘Soul.’

Even if we coined from the Greek noun ψυχή a related verb, adverb, and adjective in order to make it a semantic fit for all the categories, it should be obvious that little sense can be gained from giving ‘soul’, ‘soul-ling’, ‘soul-ly’, or ‘soul-ish’ as an answer to most of these questions. Aristotle’s categorial argument offers a negative constraint on his developing conception of soul: in order to explain how the soul can cognise things falling under different categories of being, the elemental interpretation of the *Cognitive Likeness Principle* will need to be replaced by a more flexible and non-elemental interpretation. Aristotle will argue that a revised Anaxagorean account of cognition can do just this.

7.8 The Causal Limitations of ‘Like Cognises Like’

Aristotle’s most important objection to elemental soul theories, however, is the charge that they are built upon inconsistent axioms or principles. He writes:

But it is also absurd to say that what is like is unaffected (ἀπαθὲς) by what is like, but that what is like is perceived by what is like, and that what is like is known by what is like. But they posit (τιθέασιν) that to perceive is to suffer something and to be moved (πάσχειν τι καὶ κινεῖσθαι); and in the same way, also thinking (τὸ νοεῖν) and cognising (γινώσκειν). (*DA* 1.5, 410a13–26)

According to Aristotle, some earlier thinkers forged their explanation of how natural ‘like’ items in the world interact separately from their explanation of how perception works. The charge is that earlier thinkers tended to affirm the following inconsistent triad:

- (a) If x cognises (or perceives or thinks) y , x is affected by y .
- (b) x can cognise y iff x is like y . (*Cognitive Likeness Principle*)
- (c) x can be affected by y iff x is unlike y . (*Causal Difference Principle*)

The importance of this argument is that it shows that, in not bringing the *Cognitive Likeness Principle* into conformity with the *Causal Difference*

Principle, the account of nature offered by earlier thinkers is as a whole inconsistent.⁶⁴ By positing that the soul cognises by being affected by an object like itself, in effect, elemental soul theorists who affirm the *Causal Difference Principle* are committed to the idea that cognitive events consistently violate natural law. Below, we will see how Aristotle attempts to surmount this limitation on the *Cognitive Likeness Principle* by modifying it to be consistent with his own *Axiom of Causal Association*.

7.9 The Results of Aristotle's Criticism of Elemental Soul Theorists

What is the result of Aristotle's criticisms of Empedocles' theory and other elemental theories of soul? Laying aside the argument about Empedocles' god, Aristotle has shown that elemental interpretations of the *Cognitive Likeness Principle* are involved in too many difficulties to warrant the conclusion that soul is identical to all the elements. Yet an overarching question remains: why is Aristotle concerned to criticise theories of soul built upon the *Cognitive Likeness Principle* principle at all? The answer is that Aristotle thinks that it can be saved as a first principle of psychology, insofar as it can be modified in a way that resolves (most) of the problems that he has raised against it.

In *DA* 2.5, Aristotle attempts to solve the problem of why every element does not facilitate perception by arguing for the legitimacy of a modified version of the *Cognitive Likeness Principle*. In *DA* 3.8, he tries to address the Empedoclean problem of how we perceive elemental composites, by positing that perception is the reception of the *form* of a thing (similar to an Empedoclean ratio) but *not* of the material elements from which that thing is composed, or the composite itself.

In revisiting the *Cognitive Likeness Principle* in *DA* 2.5, Aristotle begins with two assumptions: first, that the material elements *are* a crucial explanatory factor in perception; and second, that some version of the *Cognitive Likeness Principle* is operative in perception. He writes:

But there is a puzzle concerning the explanation of the fact that the senses do not perceive themselves, namely, why the senses do not produce (ποιεῖσιν) perception without external sense objects (τῶν ἑξω), even though they have in them fire, earth, and the other elements, of which elements – either in virtue of the elements themselves or their *per se* attributes (συμβεβηκότα) – there is perception. So then it is clear that the

⁶⁴ See Chapter 2, Section 2.2.

perceptive power (τὸ αἰσθητικόν) does not exist in actuality, but in potentiality only (οὐκ ἔστιν ἐνεργεία, ἀλλὰ δυνάμει μόνον), and on account of this it does not perceive [the elements that constitute its sense organ], just as that which is flammable does not burn itself by itself apart from something that produces flame; for then it would burn itself, and would have no need for actual fire. (*DA* 2.5, 417a2–9)

Aristotle's puzzle presupposes both Empedocles' doctrine that the sense organs are composed of the elements, and that we perceive elements in the world with such sense organs, which have within them a perceptual capacity.⁶⁵ Here, Aristotle uses these assumptions to introduce a problem for an Empedoclean interpretation of the *Cognitive Likeness Principle*, namely, that the sense organs should be able to perceive themselves.

Aristotle's argument assumes that any sense organ, in virtue of its elemental composition, will be actually 'like' itself, and hence should, in virtue of the *Cognitive Likeness Principle*, be able to perceive itself, or a part of itself (e.g. one part of the watery eye should be able see another part of the watery eye).

His strategy for solving this problem is to make a distinction between (i) the actual state of the sense organs *qua* elemental and (ii) the potential state of the perceptive capacity that resides within them. If one does not adopt this distinction, Aristotle thinks, then, like Empedocles, one will be faced with the problem that the sense organs, in virtue of being fire, water, earth, or air 'in actuality', should no more perceive 'like' objects in the world than themselves.

In making this distinction, Aristotle drives a metaphysical wedge between the power of perception, and the elemental composition of the sense organs. This means that Aristotle's theory of perception has to follow two constraints: first, the sense organs, in virtue of their elemental constitution, will have to operate in accordance with the *Axiom of Causal Association*, i.e. they must have a property which is literally and initially *unlike* – to some degree or another – one of the actual perceptual properties that can affect them, e.g. they must be hot, to be affected by cold, and dry, if they are to be affected by wet, etc.⁶⁶

However, the *power of perception* (τὸ αἰσθητικόν) must also be unlike a perceptible organ, and it must operate by means of *its* changes. Aristotle thinks of perceptive powers as potentialities in the soul for being altered (or quasi-altered) by a perceptible object *through* the literal changes that occur in the sense organs. For this reason, he can affirm that, as long as a *sense organ*

⁶⁵ See *DA* 2.12, 424a25–8.

⁶⁶ Cf. Johansen (1997, 55).

has some property *F* which (i) is *unlike* a property *G* in a perceptible object that acts upon it, and (ii) both this *sense organ* and its *sensory power* has the *potential* to become *like* that *G*, perception will be able to occur. Thus, under this revised likeness principle, Aristotle can agree with Empedocles that like can and does cognise like, but only in the sense that (a) a perceptual power and its organ, having initially been *unlike* a perceptible object *y*, are both *likened to y* (in respect of some quality *G*) during perception.

Aristotle's distinction between the elemental properties of the sense organs and the power of perception within them, forces him to revise the *Cognitive Likeness Principle* affirmed by Empedocles and other elemental soul theories, in a way that brings it into conformity with the *Axiom of Casual Association*, and more accurately captures the distinct roles that the perceptive power, and the elemental structure of the sense organs, play in a given act of perception. Call this revision Aristotle's *Refined Cognitive Likeness Axiom*:

Refined Cognitive Likeness Axiom =_{def} For any *x* that possess a cognitive capacity *C*, *x* cognises *y* iff (1) *x* and *y* fall under a common genus *U*, which contains opposite species *F* and *G*, and (2) *x* is potentially like *F* and *y* is actually *F*, and (3) *x* is affected by *y* in a way that likens *x* to *y* with respect to *F*.⁶⁷

Having argued that, in the case of perception, the *x* in question is a composite consisting of (i) an elementally composed sense organ, and (ii) a perceptual power, which must both be likened to a perceptible object for perception to occur, Aristotle makes a compromise between contemporary 'literalist' and 'spiritualist' interpretations of his account of perception.⁶⁸

In beginning with Empedoclean assumptions about the elemental constitution of the sense organs, he cannot admit that perception is a purely 'spiritual' change in which the elemental constitutions of the sense organs undergo no physiological change.⁶⁹ Aristotle's insistence that the olfactory channels of the nose be dried (to some degree) to receive a smell,⁷⁰ and that the tongue be moistened (to some degree) in order receive flavour,⁷¹ show that the elemental qualities of the sense organs and their channels do play this explanatory role.

⁶⁷ I take 'cognition' here to cover both perceptual and intellectual kinds of cognition. Note that the requirement that *x* have *G* in actuality is no longer in play here, because in *DA* 2.5, Aristotle accepts that some cognitive *x*'s can be in a 'neutral' state of receptivity to a range of qualities existing between *F* and *G* without being either *F* or *G*. For example, transparent material in the eye-jelly need not have any colour before receiving a colour. Even so, in many (if not most) cases of perceptual change, a sense organ's being actually *G* (e.g. dry) will be necessary and sufficient for it to potentially be *F* (e.g. moistened).

⁶⁸ Cf. Burnyeat (1992a, 1992b); Sorabji (1974); Caston (2005). Cf. Charles (2005, 116).

⁶⁹ See Cohen (1992, 64).

⁷⁰ *DA* 2.9, 422a6–7; *Sens.* 4, 442b26–443a8.

⁷¹ *DA* 2.10, 422a34–b5.

However, in drawing a distinction between the power of perception, and the actual elemental properties of the sense organs, he also cannot think that, for perception to occur, it is sufficient that an elemental sense organ take on, by being affected by, some new elemental property or form. Indeed, he specifically describes perception as a power that belongs to a sense organ ‘insofar as it is a sense organ’ (ἡ αἰσθητήριον),⁷² which implies that this capacity does *not* belong to the sense organs insofar as they are elementally composed.⁷³ Moreover, in a crucial passage in *DA* 2.12, he refutes the idea that being affected by a perceptible property (such as when air takes on a smell) is sufficient for perception to occur, by claiming that smelling is – ‘alongside’ (παρά) being altered by an odour, perceiving.⁷⁴

These two commitments are brought together in the *Refined Cognitive Likeness Axiom*, and imply a peculiar hylomorphic account of perception: *during* a perceptual likening process, an external perceptible object produces a *motion* (which exists as an unperceived first-fulfilment) in a perceptual medium (e.g. in air, or flesh) which can be received by a sense organ. Once in the organ, this motion changes a relevant material property in the organ from being potentially *F* to being/becoming actually *F* (where *F* lies on a specific range of opposites between *F* and *G*, falling under a genus, *U*). This motion in the sense organ is then (or simultaneously) transmitted through the organ ‘up to’ the perceptive soul so that it suffers a quasi-alteration and moves from the state of *potentially perceiving F* (in first-fulfilment) to *actually perceiving F* (in second-fulfilment).⁷⁵

However, the *Refined Cognitive Likeness Axiom* does not resolve all of Aristotle’s earlier challenges to elemental soul theories. In particular, it does not explain how we can know or perceive composite wholes made from the elements *as* composite wholes. At most, it shows that the sense organs, *qua* elemental, need to be unlike the external sense objects that act upon them in order to perceive them (assuming, of course, that they *also* possess a psychological capacity for perceiving).

As we saw above, Aristotle argued that, according to an elemental soul theorist like Empedocles, in order for the soul to be ‘like’ a composite object such as a stone or a man, there would have to be an *actual* stone or man in it. However, Aristotle’s *Refined Cognitive Likeness Axiom* seems to suffer a similar problem. For by this new axiom, perception only occurs

⁷² *DA* 3.2, 426b8–12.

⁷³ See Perälä (2018, 263–4).

⁷⁴ *DA* 2.12, 424b14–18. Cf. Sorabji (1992, 219); Cohen (1992, 62–3); Johansen (1997, 279 f. 30).

⁷⁵ See Lorenz (2007); Carter (2018).

if there is *potentially* a stone in the perceptive part of the soul or perceptual organ. This potential stone, one might think, must become an *actual* stone in the perceptive part of the soul *and* the perceptual organ during perception. How does Aristotle avoid making composite entities materialise in the soul and sense organs?

I suggested earlier that Aristotle might solve this problem *if* he had a way of affirming that the ratios determining the nature of each composite could somehow be detached from the elements that they supervene upon. Aristotle argues for just this sort of solution in *DA* 3.8. In this chapter, he first acknowledges his partial agreement with the elemental soul theorists by claiming that, if a soul is to know and perceive everything, it must in a way be all existing things (ἡ ψυχὴ τὰ ὄντα πῶς ἐστὶ πάντα).⁷⁶ He then tries to resolve the problem that he raises for Empedocles about how we can perceive or think about composite objects.

Aristotle argues that there are only two ways to get composite objects into the soul without violating the *Refined Cognitive Likeness Axiom*: Either the soul, or one of its parts, when actualised by a perceptible or intellectual object, (i) literally becomes the external things it perceives, or, (ii) it becomes the *forms* of those things (ἀνάγκη δ' ἢ αὐτὰ ἢ τὰ εἶδη εἶναι).⁷⁷ Aristotle suggests that (i) is implausible, despite the fact that some earlier Greek psychologists, like Democritus, affirmed that miniature replicas of things do come to be in the soul in perception. He concludes that, more plausibly, we can interpret the *Refined Cognitive Likeness Axiom* to mean that, when cognition of a stone occurs, what comes to be in the soul is not an actual composite stone, elements and all, but the form (τὸ εἶδος) of the stone.⁷⁸

How are we to interpret such a form? One option is to view it as one of the mathematically expressible ratios that Empedocles refers to when describing composites such as bone.⁷⁹ Aristotle, it seems, must reject this solution, for a simple philosophical reason. A particular ratio of elements (e.g. 3:4:2) in separation from the elements the ratio characterises, such as earth, fire, and water, would not allow us to perceive *bone*. This is because such a ratio is not unique to bone, but characterises all sorts of composites and mixtures. One needs a form that will be unique to bone.

As an alternative, Aristotle offers the idea that the form of something, e.g. a stone, is a dispositional property belonging to an actual stone in the

⁷⁶ *DA* 3.8, 431b21.

⁷⁷ *DA* 3.8, 431b28.

⁷⁸ *DA* 3.8, 431b29–432a1.

⁷⁹ Cf. Caston (2005, 313); Ward (1988); Silverman (1989).

world that can produce in our soul the mental appearance of that *whole stone*, and it is by means of this appearance that we cognise the stone itself.⁸⁰ This aspect of Aristotle's solution is especially important, for it also suggests that, without the capacity to perceive whole objects, we could only perceive isolated elemental qualities of a composite acting upon the sense organs, such as blobs of colour and sound, but never a mixed whole, such as a talking man.⁸¹ By means of this 'thick' and non-mathematical notion of form reception, Aristotle is thus able to take the phenomenal world as we experience it, and transmit the formal determinations of things in the world – through a material process reaching from things in a medium to the sense organs – to the soul, where they become the subsisting *qualia* of conscious experience.

By using the demonstrative heuristic to test out whether theories of the soul's elemental composition like Empedocles' can explain its *per se* attribute of being able to perceive, Aristotle discovers that we can neither explain perception, nor error, by using only the resources of materialist elemental psychologies. However, he also discovers that the elemental nature of the sense organs plays a *necessary* role in perception, because in virtue of their elemental constitution, the sense organs are subject to the *Axiom of Causal Association*. At the same time, he grants that the soul does need to be affected (or quasi-affected) by perceptible objects in order to perceive them, and that it needs to be like the objects that affect it in order to perceive them, as earlier psychologists affirmed but did not explain. Aristotle's solution is to revise Empedocles' *Cognitive Likeness Principle*, and accept a *Refined Cognitive Likeness Axiom* that incorporates an initial unlikeness between the sense and its objects, and a subsequent likening during perception.

However, Aristotle's criticism of the ability of elemental soul theories to explain the perception of composite wholes also places a negative constraint on his developing theory of soul. It pushes him towards the idea that we should reject mathematical explanations of the perception of composite objects, like those that rely upon Empedoclean ratios, since these are too general to capture perceptual content. Instead, he is led to conclude that we perceive composites in virtue of their ability to reproduce their forms

⁸⁰ Cf. Caston (2000, 166–74); Charles (2005, 113).

⁸¹ This is, in effect, the criticism given by Theophr. (*De Sensibus* 17–19). However, there are difficult questions here concerning the way Aristotle conceives of the perception of wholes. Even so, Aristotle's considered view is that the soul perceives a whole perceptible object at the same time as it discriminates that object's different special sense qualities. Cf. *DA* 3.7, 431a20–b1; *Sens.* 7, 449a5–20. Cf. Gregoric (2007); Marmodoro (2014); Perälä (2018).

in us, viewed as unified appearances of composite wholes and their *per se* perceptible properties that reach the soul *via* changes in the sense organs.

The upshot of Aristotle's criticisms of elemental soul theories is that, in order to be the sort of thing that receives the forms of perceptual objects through elemental and material processes, it seems that the soul will need to be more like the form of such mixed objects than one of their ingredients. Aristotle's criticism of elemental conceptions of the soul's capacity of perception thus strongly pushes him towards the *Hylomorphic Thesis*, which conceptualises the soul as a power which uses the body and its sense organs as its necessary means for accomplishing its functions in the world.

Thus, in accordance with the demonstrative heuristic, Aristotle concludes that the elemental nature of soul that seems to follow from the *Cognitive Likeness Axiom* that earlier Greek psychologists affirmed does not facilitate an understanding of the soul's *per se* attribute of causing perception. By showing the modal and epistemic weaknesses of this principle, Aristotle is able to determine that the essence of soul cannot be defined in terms of particular elements. However, at the same time, he finds within elemental theories of soul a truth that must be accepted, with modification, into his own theory. In order to perceive, a perceiver must be possessed of elementally composed sense organs whose literal changes can be transmitted to the perceptive power of the soul within them. We must now investigate Aristotle's treatment of an earlier Greek view on the soul's highest cognitive power – mind.

CHAPTER 8

Anaxagoras' Psychology

How confused is the opinion of Anaxagoras! For, having imagined the mind to be the initiating principle of all things, and suspending on its axis the balance of the universe; affirming, moreover, that the mind is a simple principle, unmixed, and incapable of admixture, he mainly on this very consideration separates it from all amalgamation with the soul; and yet in another passage he actually incorporates it with the soul. This Aristotle has also observed: but whether he meant his criticism to be constructive, and to fill up a system of his own, rather than destructive of the principles of others, I am hardly able to decide. [Trans. Holmes]

Tertullian, *De Anima* 12.2–3

8.1 Introduction

Anaxagoras of Clazomenae (ca. 500–428 BCE) was the first Presocratic philosopher to articulate clearly the idea that a cosmic mind ($\nu\omicron\upsilon\varsigma$), and not elemental materials operating through chance and necessity, moved the cosmos into its present arrangement, and that living beings have a share of this mind in themselves.¹ Thus, it is no surprise that his theory of mind comes up in Aristotle's review of theories of soul that try to account for its *per se* attribute of producing cognition.

There is good reason to think that Aristotle would have been amenable to Anaxagoras' views about mind and soul. He is the only Presocratic to avoid both of the major errors Aristotle assigns to earlier Greek

¹ Cf. *Metaph.* A.3, 984b15–20 = DK59 A58 = TEGP 65. The emphasis here is on 'clearly'. As Leshner (1995, 135) points out, each of these aspects has some precedent in Presocratic thought.

psychological theories – wrongly thinking that the soul moves other things in virtue of its own motion, and wrongly thinking that it is composed of particular (material or immaterial) elements in virtue of which it cognises like elements. Although some scholars have thought that Aristotle places Anaxagoras in the former² or the latter group,³ in fact, he places him in neither.

In his discussions of Anaxagoras' claims about mind, we also find evidence of Aristotle's potential appropriation of his doctrines. In *DA* 1.2, for instance, Aristotle represents the controversial attributes that he later ascribes to mind in *DA* 3.4 – its being unmixed and unaffected – as originally Anaxagorean.⁴ This suggests that, in order to understand Aristotle's account of mind in *DA* 3.4, it is necessary for us to understand how he interpreted Anaxagoras' claims about it, and the extent to which he adopted those claims into his own account.

To do so, I first give a short overview of Anaxagoras' cosmogony and his account of mind (Section 8.2). I then show that Aristotle's own doxographical reports about Anaxagoras differ from Plato's, and reflect that he is reading DK59 B12 = TEGP 31[F15], as well as other parts of Anaxagoras' work which we no longer possess, both carefully and seriously (Section. 8.3). I go on to explain why Anaxagoras' belief that the mind has nothing in common with anything in the cosmos raises a difficulty for Aristotle about how it can think about items in the world (Section 8.4). I then argue against the widespread view that Aristotle rejects certain elements of Anaxagoras' account of mind in *DA* 3.4. Instead, I claim, in providing his solution to the main puzzles of this chapter, Aristotle takes special care to preserve the essential features that he thinks Anaxagoras ascribes to mind, namely, its ability to know all things, its being unmixed, and its inability to be affected by mixed objects (Sections 8.5 and 8.6). I then argue that Aristotle's treatment of Anaxagoras positively constrains him to adopt the *Separability Thesis* (Section 8.7).

² E.g. Witt (1992, 172). Polansky (2007, 66, n. 14) is a notable exception.

³ E.g. Laks (1993, 24), despite noting that Theophrastus assigns Anaxagoras to the group of thinkers who believed in a 'like-cognises-unlike' principle. See *De Sensibus* 27 = Diels 507. At *DA* 1.2, 405b13–15, Aristotle notes that among those who define the soul in terms of knowledge, all of them either make it an element or composed of elements, 'except one' (πλὴν ἑνός). The exception is Anaxagoras, as Burnyeat (2002, 37) notes.

⁴ So Shields (2016, 113): 'In some respects, as regards the primary characteristics of reason, there seems to be a direct line of influence from Anaxagoras to Aristotle'.

8.2 The Fragmentary Background of Anaxagoras' Psychology

In the fragments of Anaxagoras that we possess, he commits himself to at least three basic cosmological theses:

- (T₁) There are an unlimited (ἄπειρον) number of material stuffs in the cosmos.
- (T₂) Every determinate being in the cosmos has a portion of every other thing in it.⁵
- (T₃) Generation occurs not *ex nihilo*, but by the localised recombination or separation of pre-existing material stuffs into new mixtures wherein a different material stuff predominates.⁶

Anaxagoras' doctrine of mind (νοῦς) fits uneasily into this materialist framework. This is because he holds that mind is an exception to (T₂). In discussing this exceptionality in DK59 B12 = TEGP 31[F15], he commits himself to at least three more theses:

- (M₁) Mind is mixed with nothing in the cosmos.
- (M₂) Mind knew all things in the cosmos.
- (M₃) Mind moves all mixed things in this cosmos (without being moved by any mixed thing).⁷

In what follows, I shall argue that, although Aristotle rejects Anaxagoras' (T₁)–(T₃) in his philosophy of nature, a close reading of *De Anima* shows that he attempts to preserve (M₁)–(M₃) in his philosophy of mind.

8.3 Aristotle's Account of Anaxagoras' Psychology

Aristotle casts Anaxagoras' psychology as related to that of the Platonists. He writes:

In a similar manner [as the Platonists], Anaxagoras also claims that the soul is what causes motion (τὴν κινουῦσαν), and anyone else⁸ who said that 'mind moved the whole' (τὸ πᾶν ἐκίνησε νοῦς). (*DA* 1.2, 404a25–7)

⁵ Cf. Aristotle's criticisms of this theory at *Phys.* 1.4, 187a12–188b18.

⁶ Cf. KRS (1983, 66); Graham (2004). For a good recent treatment of Anaxagoras' metaphysics, see Marmodoro (2017).

⁷ I defend the inclusion of the parenthetical part of (M₃) below.

⁸ Aristotle probably refers here to Hermotimus. See *Metaph.* A.3, 984b19.

Two things in this report are worth noting. First, it appears to contain a very rough paraphrase of a section of DK59 B13 = TEGP 33[F16], wherein Anaxagoras says:

When mind began to initiate motion (ῥηξατο ὁ νοῦς κινεῖν), there was separation off from the multitude that was being moved, and whatever mind moved (ὅσον ἐκίνησεν ὁ νοῦς), all this was dissociated. [Trans. Curd, modified]

Second, Aristotle's paraphrase of this fragment, as well as the fragment itself, contains no language that would suggest to a Greek reader that Anaxagoras' νοῦς is itself *in* motion. In fact, we find no medio-passive forms of κινέω predicated of νοῦς in *any* fragments of Anaxagoras,⁹ nor any other verbs that obviously suggest its being in motion.¹⁰ Aristotle's report is sensitive to this feature of Anaxagoras' account, and hence the similarity that he specifies between Anaxagoras' and Plato's psychology is not that they affirm soul to be a *self-mover*, but that they both affirm that soul or mind transitively *moves* bodies. In fact, Aristotle represents Anaxagoras as the only Greek thinker whose theory of soul/mind is compatible with it acting upon bodies as an *unmoved mover*.¹¹

⁹ Finding such verbs would be the only way to determine decisively that Anaxagoras did *not* possess the concept of an unmoved mover, *pace* Menn (2002, 93). Aristotle explicitly cites Anaxagoras as a source for his own doctrine that mind is unmoved at *Phys.* 8.5, 256b24–7 = DK59 A56. Other philosophical considerations also make it implausible that Anaxagoras took his divine mind to be in (local) motion. For instance, he says that νοῦς exists 'where' all things are (DK59 B14 = TEGP 34[F17]), and hence, there would be no place for it to move into. In contrast, McKirahan (2010, 217), argues that Anaxagoras, 'was the first philosopher to distinguish clearly between the mover and the moved'. Cf. Marmodoro (2017, 140, n. 16).

¹⁰ *Pace* Cherniss (1935, 172, n. 122), whose only proof is to read DK59 B13 = TEGP 33[F16] with Heidel's (1913, 731) implausible suggestion that we take νοῦς as the subject of ἀπεκρίνετο. While grammatically possible, this would force us to apply Anaxagoras' technical term for separating out *mixed elements* from the primordial mixture (e.g. in DK59 B12 = TEGP 31[F15]) to an *unmixed entity*, and to give this word the different sense of 'withdraw from'. This would be justified only if the status of νοῦς as μόνος αὐτὸς ἐπ' ἑωτοῦ had a spatial connotation, e.g. 'alone with itself *away from the mixture*'. If so, we would have expected Anaxagoras to use a parallel verb of motion (e.g. προσέρχομαι) to introduce its 'drawing near' to the mixture in order to move it. Sider (2005, 143) and Curd (2010, 67) make similar points.

¹¹ Aristotle's subtle indications in *De Anima* that Anaxagoras' mind is not subject to motion, quite surprisingly, is completely overlooked by the ancient commentators. To my knowledge, these indications are not given prominence until Thomas Aquinas. See Aquinas (*In De an.* I, lec. 3, §38).

Even so, Aristotle has honest difficulty finding in Anaxagoras' philosophical book a clear distinction between soul and mind.¹² He writes:

But Anaxagoras is less clear concerning them [*sc.* soul and mind]. For in many places he says that the cause (αἴτιον) of beauty (καλῶς) and right order (ὀρθῶς) is mind (νοῦν), but elsewhere he says that mind is identical (ταὐτὸν) to soul; for it [*sc.* mind] exists (ὑπάρχειν), he says, in all living beings, both the great and small, both the noble and ignoble. However, what is said to be 'mind' in the sense of practical reason (φρόνησιν) does not appear to belong to all living things, nor even to all humans. (*DA* 1.2, 404b1–6)

The main item of interest in this report is the fact that its account of Anaxagoras' teleology diverges from Plato's.

Unlike Plato, who in the *Phaedo* has Socrates lament that Anaxagoras did not use his νοῦς to show how it arranged the cosmos for the better,¹³ Aristotle here ascribes to Anaxagoras' νοῦς a teleological power to do exactly this.¹⁴ This suggests that, rather than relying upon Plato's claims, Aristotle has read Anaxagoras carefully enough to be able to contradict his former teacher. Indeed, he cites 'many places' (πολλοχοῦ) in which the latter claims that mind is the cause of beauty and order in the universe.¹⁵ Indeed, he later alleges that it is rather Plato himself who, in the *Timaeus*, neglects to specify how all things, such as the world soul's spherical shape and rotation, are constructed by the Demiurge for the better.¹⁶

The second thing of interest is that Aristotle's description of mind belonging 'in all living beings, both the great and the small', appears to offer another paraphrase, this time, of DK59 B12 = TEGP 31[F15]. Aristotle's claim that mind 'exists in all living things, both great and small' (ἐν ἅπασι γὰρ ὑπάρχειν αὐτὸν τοῖς ζώοις, καὶ μεγάλοις καὶ μικροῖς), echoes Anaxagoras' statement that, 'mind has control (κρατεῖ) over all things that have soul, both the larger and the smaller (τὰ μείζω καὶ τὰ ἐλάσσω)'.

¹² Pace Cherniss (1935, 292), who, missing the sense of the passage entirely, interprets Aristotle's admission as a sign of personal embarrassment, rather than scholarly honesty.

¹³ *Phaed.* 97b8–98c2 = DK59 A47 = TEGP 64.

¹⁴ *Metaph.* A.4, 985a18–21 does not contradict this claim. This passage only claims that Anaxagoras' default method of explaining why specific things are the way they are was to appeal to material necessity – for example, in accounting for the moon's light by appeal to the sun (DK59 B18 = TEGP 44[F20]), and for the rainbow by appeal to the sun's reflections in the clouds (DK59 B19 = TEGP 47[F21]). These appeals are consistent with the idea that Anaxagoras also affirmed that mind is the cause of the order and beauty of these specific natural arrangements.

¹⁵ Aristotle, in fact, is our sole ancient witness for this teleological information about Anaxagoras' depiction of the works of mind.

¹⁶ *DA* 1.3, 407b9–11.

These verbal parallels are important, since they suggest that Aristotle is attempting to be a faithful, even if not exact, doxographer.

One might allege, however, that Aristotle's loose paraphrase has already introduced a distortion into our understanding of Anaxagoras. This is because, in DK59 B12 = TEGP 31[F15], Anaxagoras does not claim that mind 'exists in' (ἐν ὑπάρχειν) living things; instead, he claims that it 'controls' (κρατεῖν) them.¹⁷ Yet, when we peruse further fragments, we see that Aristotle's interpretation of mind as 'in' living beings has warrant.¹⁸ In DK59 B1 = TEGP 11[F1], Anaxagoras seems to refer to a special way that mind exists in living things:

In everything there is a portion (μοῖρα) of everything except mind, but there are some things in which (οἷσι) mind also is.

This fragment shows that, rather than seeing Aristotle as misquoting a specific fragment, and thus distorting one of Anaxagoras' claims about how mind 'exists in' and 'controls' all living things, some of Aristotle's discussions more likely represent synopses of Anaxagoras' views taken as a whole.

Although it is not clear from DK59 B1 = TEGP 11[F1] (nor any other fragment) how to understand the mode in which Anaxagoras thought that mind existed in things, this supports the point made in Aristotle's second discussion. His claim that non-human animals and some humans lack practical reason is not, as it might first appear, a criticism of Anaxagoras' view that mind exists 'in' them.¹⁹ In context, it serves as a reason for why it is difficult to understand *how* Anaxagoras distinguished between soul and mind.

Aristotle assumes that Anaxagoras' assertion that mind is responsible for beauty and right order in the cosmos implies that it has practical reason (φρόνησις) – which power, unlike theoretical reason, enables its possessor to calculate how to act rightly and successfully.²⁰ Aristotle's query is that, since Anaxagoras in effect ascribes practical reason to mind, why then

¹⁷ Cf. Hicks (1907, 220).

¹⁸ As Barnes (1982, 407–8) notes, it is also consistent with Anaxagoras' position that mind is itself a part 'in' the mixture that constitutes other things, without itself having those things mixed *into* it (e.g. as a mint leaf might ride atop a mixed drink).

¹⁹ Cf. Shields (2016, 108).

²⁰ Cf. *NE* 6.9, 1142b33; *NE* 6.13, 1145a4–9. It is worth pointing out that Aristotle does not argue for the lack of practical reason in some living things – he takes this to be basic phenomenon that is apparent to everyone. Cf. *DA* 2.3, 415a7–11; *DA* 3.3, 427b7–10.

do some animals – all of which Anaxagoras claims are controlled by a νοῦς that is ‘in’ them (or their souls) – *not* have it? Aristotle thinks that Anaxagoras could not have been unaware of the fact that not all animals have the practical wisdom of a cosmos-ordering (or human) mind, and so he offers a guess as to what the latter was thinking.

The best explanation, Aristotle suggests, is that Anaxagoras thought of mind as controlling in a different mode whilst in animals which lack practical reason, namely, by *being* their souls. Hence, even if Aristotle thinks that Anaxagoras is committed to the inconsistent triad: (i) νοῦς and soul are identical; (ii) νοῦς is or has the power of practical reason; and (iii) practical reason is sometimes absent in things with soul, in context, his real complaint is that Anaxagoras was not clear on the matter.²¹

We can add support to Aristotle’s determination by noting that, even after a close analysis of DK59 B12 = TEGP 31[F15], as well as other fragments like DK59 B4 = TEGP 13[F4][F5], wherein Anaxagoras claims that things with soul are also compounded from all things, it is still unclear if Anaxagoras thinks of soul as (1) one of the elemental stuffs that is mixed into everything else, (2) something pure and unmixed (and hence identical to mind), or (3) some *tertium quid*. Aristotle, at least, does not seem to think that Anaxagoras preferred (1), since he later discusses a group of theorists in *DA* 1.5 who held this view,²² and there is no hint that Anaxagoras is amongst them.

However, Aristotle complicates his claim that there seems to be a difference between mind and soul in Anaxagoras by claiming that the latter also ‘uses’ (χρηται) them ‘as one nature’ (ὡς μιᾷ φύσει).

But Anaxagoras seems to claim that soul and mind are different (ἕτερον), just as we said earlier, but he makes use of both as one nature, although certainly he puts forward mind as most of all the principle (ἀρχήν) of all things; at any rate he says it [*sic.* mind] is unique (μόνον) amongst the things that exist, being simple (ἀπλοῦν) and unmixed (ἀμιγῆ) and pure (καθαρόν). And he explains (ἀποδίδωσι) both the power to know and the

²¹ Had he wanted to, Aristotle could have asserted the much stronger claim that Anaxagoras is committed to practical reason being in all living beings; for DK59 B12 = TEGP 31[F15], in asserting that ‘all mind is alike, both the greater and the lesser’ (νοῦς δὲ πᾶς ὁμοίός ἐστι καὶ ὁ μείζων καὶ ὁ ἐλάττω), can be read as promoting the idea that, if something shares in νοῦς at all, it will have all of its powers. This would suggest that if any portion of νοῦς has practical reason, then all portions of νοῦς do, whether these portions exist in humans or in cats or in moths. So Schofield (1980, 17): ‘So whatever explanation [Anaxagoras] might attempt of the superiority of Plato’s intelligence to Xenophon’s, it could not be that Plato had a better or purer or a subtler mind than Xenophon.’ Cf. Menn (1995, 28–9), and the criticism of Curd (2010, 55).

²² See Chapter 9.

power to cause motion (τό τε γινώσκειν καὶ τὸ κινεῖν) in virtue of this same principle, when he says that 'mind moved the whole' (νοῦν κινήσας τὸ πᾶν). (*DA* 1.2, 405a13–19)

Aristotle's idea is that, despite indications that for Anaxagoras mind and soul are distinct, nevertheless, they both seem to possess the same nature, namely, the power to produce cognition and motion.²³ This interpretation is plausible, for in DK59 B12 = TEGP 31[F15], Anaxagoras does *not* simply say that mind moved the whole; he also says that mind held the decision (γνώμην) over what kinds of things would come out of the whole it moved.²⁴ Aristotle is attracted to this depiction of mind. For, as he says against Democritus' conception of soul atoms dragging around the body from within, 'generally, the soul does not appear to move the animal (ζῷον) in this way (οὕτω), but [appears to move it] by a sort of decision (διὰ προαιρέσεώς τινος) and thinking (νοήσεως)'.²⁵ Thus, despite some interpretive reservations, he thinks that Anaxagoras posited a single first principle, νοῦς, in which the power of cognition and the power to produce motion naturally coincide. This makes Anaxagoras' mind functionally equivalent to the preliminary account of soul that Aristotle specifies in *DA* 1.2.

Aristotle's most important discussion of Anaxagoras' conception of mind, however, occurs within a discussion of earlier psychological views which give an account of the natural principle(s) or causes in virtue of which the soul cognises. In this context, we suddenly find a complaint about the *lack* of such a principle in Anaxagoras:

But Anaxagoras alone says that mind is unaffected (ἀπαθῆ), and that it possesses nothing in common (κοινὸν) with any other thing. But being of this sort, he did not specify in what manner (πῶς) and in virtue of what cause (διὰ τίν' αἰτίας) it will know (γνώριεῖ), nor this is evident (συμφανές) judging by the things he said. (*DA* 1.2, 405b19–23)

In this quasi-criticism, Aristotle specifies another attribute that supposedly belongs to Anaxagoras' νοῦς, namely, the properly of being 'unaffected'

²³ As others have noted, the term νοῦς always has a cognitive connotation, no matter what other description (e.g. 'causing motion') attaches to it. Cf. von Fritz (1943, 1945, 1946); Laks (1993, 26). As Hussey (1972, 139) points out, it is the power to cause motion that is innovative in Anaxagoras' conception of νοῦς, not its power to cognise.

²⁴ See Leshner (1995), for the argument that γνώμην in DK59 B12 = TEGP 31[F15] should be translated 'decision'. Curd (2010, 60) emphasising the cognitive element related to decision, opts for 'discernment'.

²⁵ *DA* 1.3, 406b24–5. See Chapter 4, Sections 4.6 and 4.7.

(ἀπαθής). At first glance, this claim is confusing, since Anaxagoras does not use the term ἀπαθής in our extant fragments.²⁶ Fortunately, we can reconstruct why Aristotle feels confident to ascribe this attribute to his νοῦς.

As others have recognised, Aristotle is appealing here to the *Axiom of Causal Association*. As we saw earlier,²⁷ this axiom states:

For all x and y , x can be affected by y by nature iff (1) x and y fall under a common genus, U , which contains opposite species F and G , and (2) x has F and y has G .

Since Aristotle takes this to be a fundamental metaphysical principle which grounds the possibility of causal interaction between objects, he assumes that, for Anaxagoras' mind to think, it will need to be affected somehow by the mixed bodies that it thinks about and controls. The problem is that, since (i) an unmixed mind and (ii) mixed bodies do not belong to the same genus (and hence, seem unable to possess qualities that are opposite to one another in species), according to the *Axiom of Causal Association*, it should be impossible for mind to be affected by mixed bodies. However, if mixed bodies cannot affect Anaxagoras' mind, then it does not seem possible that such a mind could acquire knowledge of them, since cognition, as Aristotle codifies in the *Refined Likeness Axiom of Cognition*, consists in a type of being affected.²⁸

8.4 Aristotle's Puzzle about Anaxagoras' Mind

The causal interaction problem that Aristotle raises for Anaxagoras' conception of the mind-world relation is the same one that we saw he raises earlier for most earlier definitions of soul which fail to explain the soul-body relation. This problem would be more difficult for Anaxagoras to resolve than it would be for most other Presocratics or for Plato. Whereas most of their theories, Aristotle claims, simply fail to add to their definitions of soul and body an explanation that accounts for their natural abilities to interact,²⁹ suggesting that, in principle, they might be able to do so, Anaxagoras' theory is in danger of having ruled out this possibility from the outset, in virtue of his commitment to mind having *nothing* in common with anything else in the world.

²⁶ Hence, this term is not, *contra* Polansky (2007, 437), 'applied prominently by Anaxagoras to mind.'

²⁷ See Chapter 2.

²⁸ See Chapter 7, Section 7.9.

²⁹ *DA* 1.3, 407b13–19. See Chapter 2.

On the one hand, given the truth of the *Axiom of Causal Association*, Anaxagoras' affirmation that νοῦς is pure and unmixed seems to rule out the possibility that it could *act upon* (or control) a corporeal mixture, such as an ensouled body, in order to set it moving. On the other hand, his affirmation that it cannot *be acted upon* (or be controlled) by other mixed items in the world seems to rule out the possibility that it could become cognitively aware of those items in accordance with the *Refined Likeness Axiom of Cognition*. If so, then it is unclear how mind could be present in animals in a way that could explain the contents of their knowledge of the world at all – whether in the mode of sensory awareness, or in the mode of practical or theoretical reason. As we shall see, because Aristotle wants to develop his own doctrine of mind out of Anaxagoras', in *DA* 3.4 he will take it upon himself to solve this causal association problem.

8.5 Aristotle's Appropriation of Anaxagoras' Unmixed Mind

In *DA* 3.4, we learn why Aristotle is so careful about interpreting Anaxagoras' doctrine of mind. It is because he thinks that Anaxagoras' (M1), that mind is not mixed with other bodily things, provides a good causal explanation for his (M2), that it knew all things. He also thinks that this insight can explain why it is also necessary for *our minds* to be unmixed with anything bodily. By showing that Anaxagoras' account of mind is a good one, Aristotle is positively constrained to accept the *Separability Thesis*. In doing so, he will accept that the mind is not a capacity that belongs to an ensouled body *qua* hylomorphic compound (i.e. in virtue of the formal *and* material features of an ensouled body and its organs), but a capacity that belongs to *one part* of a hylomorphic compound – *the soul*.³⁰ His reasoning begins as follows:

If indeed thinking is just like perceiving, it would consist in either a being affected by a thinkable object, or a different sort of being affected. Thinking must therefore be unaffected (ἀπαθές), but be receptive of form and this sort of thing in potentiality, and not be this thing, but be similar to it – just as the perceptive power (τὸ αἰσθητικόν) is in relation to perceptible things, so the mind is towards thinkable objects. It is necessary, therefore, since mind thinks everything (πάντα νοεῖ), for it to be unmixed (ἀμιγῆ), just as Anaxagoras says, in order for it to have control (κρατῆ), that is to say, in order to know (γνωρίζη); for if what belongs to something

³⁰ Cf. *Metaph.* Δ.18, 1022a31–2.

else (τὸ ἀλλότριον) appears in it by nature (παρεμφαινόμενον),³¹ it hinders (κωλύει) and blocks (ἀντιφράττει) it, so that there is no nature at all belonging to mind except this one – that it is capable (δυνατόν) [of receiving thinkable objects]. Therefore, so-called ‘mind’ (I mean by ‘mind’ that with which (ᾧ) the soul reasons and infers) is not among the beings that exist in actuality (οὐθὲν ἐστὶν ἐνεργεῖα τῶν ὄντων) until it thinks. (*DA* 3.4, 429a13–24)

Aristotle begins by arguing that there is a parallel between the powers of thinking and perceiving. Both are to be viewed as naturally receptive of, because able to be *affected* by, a certain kind of form, but naturally *unaffected* by objects not related to them by nature.³² For instance, the capacity for hearing can be affected by audible forms, but not visual forms. In making this affirmation, Aristotle accepts that the power of mind to acquire its concepts should be understood to operate on the model of the *Refined Cognitive Likeness Axiom*. To remind, it runs as follows:

Refined Cognitive Likeness Axiom =_{def} For any x that possess a cognitive capacity C , x cognises y iff (1) x and y fall under a common genus U , which contains opposite species F and G , and (2) x is potentially like F and y is actually F , and (3) x is affected by y in a way that likens x to y with respect to F .

As we saw in the previous chapter, Aristotle takes this axiom to apply to the *powers of perception* working in coordination with the elementally composed spatial organs in which they reside. This is why he insists that a perceptual organ must be made of a material and structured in a way (e.g. by being a sort of mean) that explains its ability to be *literally* receptive of F (e.g. the eyes must to be made of transparent material because this is the sort of material fit to receive colour). This constraint implies that any given perceptual organ (e.g. the eyes) will be of a nature *not* to receive forms from another range of perceptible forms (e.g. smells).³³ The material nature of a given sense organ then, for Aristotle, serves to explain both how it can be *likened to*, and affected by, a peculiar range of perceptible

³¹ Aristotle's own prior uses of παρεμφάνω in *Phys.* 4.4, 212a7–9 and *Phys.* 4.14, 224a1 show that he takes this term to refer to a thing or attribute that appears in or alongside something by nature. Pace Caston (2000), there is no need to think that παρεμφαινόμενον evokes *Tim.* 50d–51b, which, although offering a similar argument about the cosmic receptacle's need to have no shape manifest in it (παρεμφαίνον), uses metaphors belonging to a schema of visual distortion and reflection, whereas the metaphors here belong to a schema of blocking and reception.

³² Including bodily changes that might be thought to destroy these capacities. See *DA* 1.4, 408b18–29.

³³ *DA* 2.11, 424a2–15. See Sisko (1999, 260, n. 23).

forms appropriate to it, and why it *cannot be likened to*, and hence cannot be affected by, the peculiar forms that belong to other senses.³⁴

Here, however, Aristotle points out that these constraints must be abandoned with respect to mind. For mind, it is claimed, is supposed to think *all things*.³⁵ However, it seems to be true *a priori* that no material object, *qua* material (the brain, for example) could be commensurate with, or be a mean between, all thinkable objects or qualities. This is because there is no bodily material that could intelligibly be said to exist in a mean state between all formally specifiable opposites. The ratio of hot to cold that constitutes flesh, for instance, could not act as a mean that serves to judge the *concept of triangle*, because the concept of triangle is neither an excess nor a deficiency of, nor a mean between, hot or cold.³⁶

Aristotle uses the idea that no material substance or organ is sufficient to provide an explanation of the range of objects that the mind can receive to confirm his acceptance of a central claim of Anaxagoras, namely, that mind is not mixed with body. In doing so, he offers a cognitive interpretation of Anaxagoras' notion of mind's power to control by interpreting it as a power to know.

It is not obvious, however, how the principle that he appeals to at *DA* 3.4, 429a20–1 – which I have translated as, 'for if what belongs to something else (τὸ ἄλλότριον) appears in it by nature (παρεμφαινόμενον), it hinders and blocks it [i.e. mind]' – explains how the mind can control/know all things any better than the principle that mind is composed of, or is mixture that contains, the elements of all things.³⁷ Some progress can be made by noting that Aristotle almost certainly means to evoke Anaxagoras' claim that:

For if mind were not by itself, but had been mixed with anything else (ἐμμέικτο ἄλλῳ), then it would partake of all things ... and the things mixed together with it would hinder (ἐκώλυεν) it, so that it would control (κρατεῖν) none of the things in the way that it in fact does, being alone by itself. (DK59 B12 = TEGP31[F15])

³⁴ I bracket here the problem of the common perceptibles.

³⁵ Aristotle's commitment to mind's ability to know all things is certainly connected to his belief that there is a science of being *qua* being. Cf. Politis (2001) and Cohoe (2013). However, it is also important to remember that, in the *De Anima*, Aristotle suggests that this thesis is part and parcel of earlier Greek views of the soul's power of cognition (e.g. at *DA* 1.2, 403b20–8).

³⁶ This is the philosophical justification lying behind *DA* 3.4, 429b10–21, wherein Aristotle distinguishes between discerning a perceptible thing, and discerning its essence.

³⁷ Different commentators translate this line differently. Cf. Ross (1961, 290); Politis (2001, 381–2); Caston (2000, 140, n. 10); Lewis (2003, 100, n. 23); Cohoe (2013, 357, n. 25).

In these lines, Anaxagoras seems to be saying that mind could not ‘control’ (or, as Aristotle has it, ‘know’) other mixed things had it been mixed with them.³⁸ Call this Anaxagoras’ *No Purity No Control Principle*. In *DA* 3.4, Aristotle uses this principle to make a further inference about mind that is not clearly present in Anaxagoras, namely, that *necessarily*, if mind thinks all things, it cannot be mixed. How can we explain this inference?

The first way to do so is to see that Aristotle takes the *No Purity No Control Principle* to be in accord with his *Refined Cognitive Likeness Axiom*, which presupposes that something cannot receive a form *F* if it is already in actuality *F*. Thus, he thinks that his doctrine that mind necessarily needs to be potentially such as its object is, before it is so in fulfilment, explains why it would necessarily be hindered from cognising the forms of certain things were it to have something else actually mixed into it.

If mind were mixed with something else by nature or essentially, it would actually have some form *F* throughout its existence. However, of metaphysical necessity, what actually exemplifies some form *F* cannot receive *F*. If I, for instance, have received a dark suntan at the beach, of metaphysical necessity, I can no longer receive the same dark suntan at the beach (but can only become lighter or darker).

Aristotle then uses the *No Purity No Control Principle*, now fused with his own principles of potentiality and fulfilment, to infer a corollary about the mind’s relationship to the ensouled bodies of rational animals like ourselves:

Because of this (διὸ), it is also reasonable (εὐλογον) that mind has not been mixed (μεμειχθαι) with body; for [if it were, in receiving a form] it would come to be a certain quality (ποιός τις), such as cold or hot, and there would be an organ for it, just as there is for the perceptive power; but as it is, there is none.³⁹ And those who say that the soul is the ‘place of forms’ speak well, excepting that it is not the whole soul, but the thinking part of soul [that is the place of the forms], and not the forms in fulfilment, but in potentiality. (*DA* 3.4, 429a24–9)

Commentators have often thought that Aristotle is making the claim here that, were mind to be of a bodily nature, like the organ of touch, it would have a certain bodily quality *F*, which would prevent it from thinking *F*. The idea goes like this: if the mind’s bodily organ were normally 27°C, then mind could not form the concept of 27°C because it could not receive this qualitative form (being this temperature already). Mind would thus

³⁸ Pace Caston (2000, 141).

³⁹ Cf. Shields (1995a, 314).

be like the organ of touch, which cannot discriminate the temperature of an object that is as hot or cold as itself.⁴⁰

However, if Aristotle's main concern is with bodily organs causing intellectual 'blind spots', this would be a pretty meagre argument for the immateriality of the mental.⁴¹ For why not simply accept that mind knows all the things there are *except* those things that constitute the standing qualities of its natural organ?

It is more likely that something like Franz Brentano's interpretation of the corollary argument is correct. He argues that Aristotle's point is really about what *kind of form* minds receive. Being mixed with the body, Aristotle suggests, would make it the case that the mind's function is to be able to be affected by, in order 'to become' (γίγναιτο), those sorts of forms that affect bodies *qua* bodies, namely, perceptible forms like hot and cold.⁴²

In contrast, Aristotle thinks that mind does *not* become a certain perceptible form (αἰσθητόν). Instead, he thinks that mind becomes, or changes into, a thinkable form (νοητόν). These latter forms are not particular qualities of bodies perceived in space and time, but rather universals and substantial essences.⁴³ Mind, Aristotle thinks, cannot perceive a form in the way that perception perceives it, just as the power of perception cannot think a form in the way that a mind thinks it.⁴⁴ This, for Aristotle, constitutes a categorical distinction between objects of the mind, and objects of the senses.⁴⁵

This distinction explains why mind does not have a bodily organ. As I pointed out above, the purpose of a perceptive power being 'mixed' with the body is to give it the necessary means of accomplishing its function, and a psychological function is defined by the kind of object it receives.⁴⁶ Sense organs, for Aristotle, are necessary in order to mediate the transmission of distinct ranges of perceptible differences, falling under distinct perceptual genera, to the perceptual capacity of the soul, in accordance with the *Refined Cognitive Likeness Axiom*.⁴⁷

⁴⁰ DA 2.11, 424a1–5. See Sisko (1999, 262).

⁴¹ See Shields (1995a, 325).

⁴² See Brentano (1977, 229, n. 35), who notes that the optative γίγναιτο suggests that Aristotle is concerned with the mind's potentially *becoming* hot or cold, not its *being* so. Cf. DA 3.5, 430a14–15.

⁴³ DA 2.5, 417b22–4; DA 3.4, 429b9–22.

⁴⁴ See Cohoe (2013, 372–3).

⁴⁵ DA 3.8, 431b20–4; APo 1.31, 87b29–33.

⁴⁶ DA 2.4, 415a14–22.

⁴⁷ DA 3.2, 426b8–12. Aristotle goes so far as to argue that there could not be any other sense beyond the five that we have. See DA 3.1, 424b22–425a13.

So, by analogy to the general claim that having some actual form would hinder mind from receiving some class of objects, Aristotle claims that by having a bodily organ, a mind would be limited to being changed by, and the contents of its thinking explained by, the *perceptible qualities* that its material organ was suited to receive. However, what material thing could be uniquely suited to receive universals like the *concept* of colour, or pity, or infinity?⁴⁸ For a universal such as colour is neither white nor black, nor any other colour.

One might object that this is a point that, as modern philosophers, we should feel free to reject. We now tend to accept the scientific picture that a very complex bodily organ, namely the brain, can encode abstract information about the world in some material way. However, our modern notion of material encoding comes at a philosophical price. Among other things, affirming that the brain materially encodes our abstract knowledge of the world at a particular spatio-temporal location within it (e.g. knowledge of the truths of mathematics, physics, and biology), opens the door to scepticism about this knowledge. This is a problem that Aristotle thinks many of the Presocratics are susceptible to, since they tend to conflate the mechanisms that control perceptual cognition with those that control intellectual cognition.⁴⁹ He thinks that this position, for Presocratics like Democritus and Empedocles, implies that our knowledge is arbitrarily controlled by, because essentially dependent upon, the physical states of different human bodies and their cognitive organ(s) at different times in relation to different environments. For him, this raises the spectre of Protagorean relativism.

In defence of Aristotle's immaterialism about the mind against our modern picture, we might summarise his reasons for keeping the mind free from material mixture in the following way: if our conceptual knowledge of essences and universals (e.g. the essence of a fundamental particle, or of a neuron), is mediated by a material process that encodes these concepts at a particular spatio-temporal location in the brain, then it is not clear if we can ever be justified in thinking that this encoded concept represents objects in the world correctly.

For instance, if a given neural configuration with structure S_i encodes the concept 'animal', what reason is there for thinking that this materially encoded concept represents correctly the nature of the objects it picks out in the world? It seems that, if half of the human brains in the world were

⁴⁸ See Brentano (1977, 80).

⁴⁹ *DA* 1.1, 404a27–31; *DA* 3.3, 427a17–b5. See Frede (2008).

to have not S_1 , but a neural state S_2 , which encoded the concept 'angel', and S_2 picked out the same group of objects in the world as S_1 , we would have no way of telling, from a materialist standpoint, whether we were on heaven or on earth. This is because all attempts to discover what was the case would themselves be mediated by further particular material neural states, $S_3 \dots S_n$, within the scientists who attempted to determine which of S_1 or S_2 represented the world correctly (if either did).

However, if we think of universals and essences like Aristotle, namely, as exemplified in immaterial minds in virtue of a chain of causes that link back from the contents of an immaterial mind to an immaterial thinkable form present in material things (namely, thinkable forms in a mind drawn from images caused by perceptions caused by perceptible forms caused by their substantial bearers), it seems we can avoid this problem.⁵⁰ This is because Aristotle thinks that the mind's objects are not *representations* of what is knowable, but what *is* knowable – thinkable forms – directly instantiating themselves in a mind that is not subject to being cognitively altered by contingent material factors in the brain or the environment. Indeed, given the truth of the *Axiom of Causal Association*, mind could not be altered in those material ways.⁵¹ Mind can only be affected by its proper mental objects, and those objects are the activities of things in the world insofar as they are intelligible. This is why Aristotle is justified in thinking that, if mind receives the thinkable forms of all things, it cannot do so with an organ in the body, but only with the part of soul that reasons and supposes certain things to be the case.⁵² Thus, in the opening section of *DA* 3.4, Aristotle wholeheartedly accepts, with no real change, Anaxagoras' doctrine that mind is not mixed with anything bodily.

8.6 The Puzzle about Anaxagoras' Mind Revisited

Having adopted Anaxagoras' claim that mind is by nature unmixed with the body, Aristotle now has to face his earlier problem – how can such an unmixed mind come to think about its objects in the intra-generic way

⁵⁰ It is notable that, in the *Metaphysics*, at least part of Aristotle's motivation for thinking that we have minds that grasp thinkable essences is to keep perceptual idealism at bay, since essences (which are potentially the objects of mind) do *not* have to be perceived or thought about in order to exist in second-fulfilment, whereas perceptual qualities do (see *Metaph.* Γ.5, 1010b30–1011a2).

⁵¹ Although he is happy to admit that such factors hinder the expression of, and our conscious access to, our mind's knowledge. See *DA* 1.4, 408b19–28.

⁵² Incidentally, this helps to show that φαντάσματα (cf. *DA* 1.4, 408b15–19; *DA* 3.2, 425b24–5), which *are* resident in certain physical organs in the body, cannot be identical to the mind's objects.

required by the *Refined Cognitive Likeness Axiom*? This puzzle appears again as Aristotle continues to investigate the nature of mind *DA* 3.4, when he writes:

But someone might raise a puzzle, if mind is simple (ἀπλοῦν) and unaffected (ἀπαθές) and it has nothing in common with anything at all (μηθενὶ μηθὲν ἔχει κοινόν), like Anaxagoras says, how will it think (πῶς νοήσει), if thinking is identical to suffering some affection (πάσχειν τι) (for it is insofar as something common (κοινόν τι) exists in two things, that one seems to be what acts, and the other seems to be what is affected); and further, [someone might puzzle] whether mind itself is thinkable (νοητὸς καὶ αὐτός); for [if so] either mind will belong in other things (if it is not in virtue of something else that mind is thinkable) – since ‘what is thinkable’ is something one in species – or it will have something mixed [in it], which makes it thinkable in the same way as the other things are. (*DA* 3.4, 429b22–9)

There are two problems here. The first is how mind thinks about other things; the second is how (or if) mind can think about itself.⁵³ The first problem arises because Anaxagoras claims that mind has *nothing* in common with any of the other mixed objects in his cosmos. As we saw above, the *Axiom of Causal Association* states that agents and patients can only interact by nature if they fall under a common genus, and the *Refined Cognitive Likeness Axiom* assumes this truth. Hence, it seems like Aristotle and Anaxagoras cannot both be right.

The second problem is more obscure. Commentators have often found it difficult to reconstruct what exactly Aristotle’s reasons are for thinking that, if mind is simple, unaffected, and has nothing in common with anything else, then if it thinks *itself*,⁵⁴ either (a) it will be *in* other things, or (b) something will be ‘mixed’ into it. Scholarly reconstructions of this argument are often speculative and unpersuasive – for example, that Aristotle is claiming, if the mind thinks itself, we might only be able to think about other minds,⁵⁵ or that all other things do have mind in them, because mind just *is* the ‘formal structure of the universe become aware of itself’.⁵⁶

Part of the reason for this disparity of opinion is that most attempts at solving these problems ignore the fact that Aristotle places both of them upon Anaxagoras’ doorstep. For this reason, a more historically minded interpretation is in order.⁵⁷ Since mind, as DK59 B12 = TEGP31[F15] says,

⁵³ Cf. *Parm.* 132b3–c12.

⁵⁴ As Aristotle claims it does at *DA* 3.4, 429b5–9.

⁵⁵ E.g. Polansky (2007, 452).

⁵⁶ E.g. Kahn (1992, 375).

⁵⁷ See Driscoll (1992).

knew the items that it separated out of the primordial mixture, we can surmise that Aristotle and his students thought it patently obvious that mixed material things are for Anaxagoras also thinkable things. However, if so, this causes a problem for Anaxagoras' mind – if, that is, his mind is *also* a thinkable thing.

This is because Anaxagoras is committed to mind having *nothing* in common with anything else. However, if mind and its mixed objects both contain an 'ingredient' that causes them to be *thinkable*, Aristotle says, then mind will have at least one property – *thinkability* (or what causes it) – in common with other things.

If so, the positive consequence will be that mind will be able to be affected by such objects, just as the power of perception is affected by perceptible objects; the negative consequence is that Anaxagoras' mind will be in danger of becoming naturalised, by becoming one more material object amongst others. This affirmation would render its capacity for the reception of universals and essences highly problematic. The dilemma Aristotle poses for Anaxagoras' philosophy of mind is this: either what causes thinkability is a *material property* mixed into things, in which case (if mind thinks itself) mind will itself be partly or wholly material, or what causes thinkability is a *mental property*, in which case any material thing that can be thought will be partly mental, and as such, will have mind mixed into it.

8.7 The Results of Aristotle's Criticism of Anaxagoras

Aristotle does not, as some commentators claim, take the properties that Anaxagoras ascribes to mind as irrelevant to solving this dilemma,⁵⁸ nor does he reject them.⁵⁹ His solution runs as follows:

Or, is the being affected (πάσχειν) in respect of the 'something common' (κοινόν τι) we distinguished earlier, because mind is somehow potentially the thinkable things (δυνάμει πῶς ἐστὶ τὰ νοητὰ), but in fulfilment none of them until it thinks (ἐντελεχείᾳ οὐδέν, πρὶν ἂν νοῇ)? But 'in potentiality' in this way – just as nothing exists on a writing tablet (γραμματεῖω) that has not actually been written upon; it happens just this way in respect of mind. Further, mind is itself thinkable in the same way as [other] thinkable things. For in respect of things without matter (τῶν ἀνευ ὕλης), mind's-thinking-about-something and something's-being-thought-about

⁵⁸ E.g. Hamlyn (2002).

⁵⁹ E.g. Ross (1961, 294).

(τὸ νοοῦν καὶ τὸ νοούμενον) are the same (τὸ αὐτό); for theoretical knowledge and that which is theoretically known are the same. (But the cause of why it is not always thinking we should investigate later). But in regard to things which have matter, each of them is potentially thinkable. It follows that mind will not belong in them (for mind is the potential to be such things apart from matter), but what is thinkable will belong in mind. (DA 3.4, 429b29–430a9)

Aristotle's solution has three components: (i) a denial that the kind of being affected that mind undergoes when it acquires a piece of knowledge (i.e. when it transitions into second-potentiality/first-fulfilment) involves the sort of suffering that mixed material objects undergo in ordinary changes; (ii) an affirmation that there is a common genus of mind and mental objects, namely, 'object of mind' (νοητόν); and (iii) an affirmation that mind's being affected by its objects involves a form of opposition, namely, mind being in a state of privative ignorance with regard to the possession of concepts, and being in a state of knowledge after acquiring its concepts at second-potentiality/first-fulfilment.

In respect of (i), Aristotle points us back to DA 2.5, where he argues that there is a difference between (a) a destructive affection, which destroys the nature of something, and (b) a preservative affection, which helps a thing fulfil its own natural potentiality. He writes:

Nor is suffering (τὸ πάσχειν) something simple; but one kind is a kind of destruction (φθορά) by what is opposite, and another is more a preservation (σωτηρία) of that which is in potentiality by what is in fulfilment and like it in the way that potentiality holds in relation to fulfilment. (DA 2.5, 417b2–5)⁶⁰

If mind acquires knowledge by way of the latter kind of suffering, Aristotle suggests, then when it acquires a universal concept, it will not be true to say that it 'suffers' in an ordinary destructive way wherein a thing changes by having a property, *F*, which it instantiates, destroyed *via* the gradual instantiation in it of an opposite property, *G* (e.g. a wet thing becoming dry). Instead, Aristotle thinks that when mind acquires a piece of knowledge, it transitions only from being *potentially* the thinkable form, *G*, to being *in fulfilment* the thinkable form *G*, without losing any other

⁶⁰ The number and kinds of distinctions Aristotle marks out in DA 2.5 are controversial. Cf. Burnyeat (2002) and Heinaman (2007). Given what Aristotle says here, it must be that mind's transition (through learning) from first-potentiality to second-potentiality/first-fulfilment is a preservative affection that is also a transition from a privation to a disposition. See Bowin (2011).

thinkable form *F* which it may have (although it does lose a *privation*, namely, being-ignorant-of-*G*). If so, Aristotle thinks, Anaxagorean *unaffectedability* is preserved, because in acquiring its objects, mind is really just developing into its own nature, i.e. fulfilling its dispositional potential to be the thinkable forms of 'all things'.

In respect of (ii), Aristotle claims that *object of mind* (νοητόν) is the unitary genus under which both mind and its intelligible objects fall, because mind can become any specific thinkable form *F* that (preservatively) affects it, at which point mind can also be an object to itself.⁶¹ Importantly, Aristotle does not think this forces us to accept that mind resides *in* any mixed or material body, since objects-of-mind (νοητά), i.e. thinkable forms, only exist in composite things potentially. In other words, the objects of mind (thinkable forms) are not *actually* in anything in the world *qua* thinkable; instead, Aristotle thinks that, while things in the world (e.g. humans) have formal essences (e.g. a what-it-is-to-be-human) which are thinkable, they only become thinkable in *fulfilment* once a mind has thought about them. Roughly, Aristotle thinks that after a perceptual process transmits the perceptible forms of those things to the soul and deposits them as images (φαντάσματα), the mind can abstract from such images the formal essences of those objects to make them into actual objects of thought.⁶²

Aristotle argues that *when* the νοητά in such images become *actual* (i.e. when mind transitions from a state of first-potentiality to a state of second-potentiality/first-fulfilment), they do not become actual *in* the mixed object; rather, they become actual in the mind that acquires them. This is a coherent way of affirming, with Anaxagoras, that mind – both before, and after, it becomes its objects, shares no *actual* property in common with the mixed objects it thinks about.⁶³

Finally, in respect of (iii), Aristotle also affirms that there is a specific contrariety involved in mind acquiring its objects. Transitions from first-potentiality mind, in which condition mind potentially has knowledge but is actually in the privative state of ignorance⁶⁴ – after learning and many changes – to second-potentiality/first-fulfilment mind,⁶⁵ in which

⁶¹ Cf. Sisko (2000, 186), and Polansky (2007, 453).

⁶² *DA* 3.8, 432a3–9.

⁶³ *Pace* Lewis (2003, 100). This is essentially the view of Philoponus as well. See Charlton (1991, 58). See also Lewis (2003, 96, n. 15).

⁶⁴ *DA* 2.5, 417a26–7.

⁶⁵ *DA* 2.5, 417a27–8. See Burnyeat (2008, 19–24).

condition mind is identical to its objects and able to contemplate them at will in second-fulfilment,⁶⁶ Aristotle counts as a change from one opposite state to another,⁶⁷ namely, a privation (στέρησις) to a disposition (ἕξις).⁶⁸

Aristotle's final point explains how mind is able to think itself. He appeals to his doctrine that mind's thinking about something is a reflexive act, such that mind thinks itself alongside, or indirectly, in virtue of thinking something else.⁶⁹ Thus, mind's sharing nothing in common with anything non-mental is preserved, at the same time as its generic unity with thinkable objects,⁷⁰ its ability to think itself, and its ability to be changed by its own mental objects, is established.

It should now be clear that Aristotle's charitable and sophisticated treatment of Anaxagoras, which leads to his appropriation of the latter's metaphysical theses, (M₁), (M₂), and (M₃) in *DA* 3.4, and his serious attempt to solve the puzzle of how Anaxagoras' simple and unaffected mind could be affected so as to think its mixed material objects, shows that he did not investigate the latter's views in *De Anima* in order to proleptically promote the truth of his own pre-established theory of mind.

Aristotle is attracted to the idea that mind stands out as generically different from other material things, namely, as an intellectual power whose nature does not, and indeed cannot, require a bodily or material organ. However, in adopting Anaxagoras' unmixed mind into his own psychology, Aristotle is forced to solve the problem of how cognition can take place, given that Anaxagoras held that mind has nothing material mixed in it in virtue of which it can be affected by the material things it thinks about. Further, it could only think, Aristotle says, if it can be changed somehow by what it thinks about, as the *Refined Cognitive Likeness Axiom* states.

Aristotle is able to solve all these problems by appealing to his doctrine of preservative change, his doctrine that 'object of mind' is a unified genus, under which different thinkable forms or essences fall as species, and his claim that in learning, mind undergoes a transition from a privative stage of ignorance of those species (after many *preservative* changes), into the opposite state of knowledge of them. Thus, despite the fact that

⁶⁶ *DA* 2.5, 417a28–9.

⁶⁷ *DA* 2.5, 417a31–2.

⁶⁸ See *Metaph.* I.4.

⁶⁹ See *Metaph.* Λ.9, 1074b35–6. Aristotle does not need mind and its objects to be indiscernibly identical to one another, in the Leibnizian sense, in order for them to be 'the same' as one another. A good critique of the identity thesis may be found in Lewis (1996).

⁷⁰ *Pace* Ross (1961, 294).

Anaxagoras was murky on the distinction between soul and mind, and despite the fact that he did not explain how it could think its objects, nevertheless, in respect to νοῦς being unaffected, unmixed, and sharing nothing in common with anything material, here, Aristotle affirms that he spoke without a lisp.

It should be clear that Aristotle's appropriation of and development of Anaxagoras' views about mind positively constrain him to adopt the *Separability Thesis*. First, mind could not be a capacity for thinking all things if it resided in an organ that mediated its objects; second, its ability to think a concept is best explained by the idea that a mind is the capacity to become intellectual essences. This account still does not explain what bodily conditions hinder or weaken the activity of mind, or why they do so. But it does give Aristotle a strong reason to affirm that mind is a capacity whose existence is not common to body and soul, which implies that its bearer, a rational soul, might continue to exist when separated from bodily conditions at death.

The Puzzle of the Soul's Uniformity

In the confidence that their principles are true they are ready to accept any consequence which follows from them – as though some principles did not require to be judged from their consequences, and particularly their final result. And that result, which in the case of productive knowledge is the product, in the knowledge of nature is the phenomena always and properly given by perception.

Aristotle, *De Caelo* 306a14–17

9.1 Introduction

In the previous chapters, we have seen that Aristotle applies his demonstrative heuristic to particular earlier theories of soul in an attempt to see if they can explain the soul's *per se* attributes of producing motion and cognition in animals. However, Aristotle also engages with his predecessors in order to help him solve certain puzzles about its nature. Early in *DA* 1.1, Aristotle raises the puzzle of whether or not every soul is uniform (ὁμοειδής).¹ In *DA* 1.5, he will take it upon himself to solve it.²

This question, as with many others in *De Anima*, has a Platonic precedent.³ In the *Phaedrus*, Plato has Socrates claim that, in considering the

¹ *DA* 1.1, 402b1–2. See Johansen (2012, 48). The fifth puzzle, at *DA* 1.1, 402b3, being whether soul – if *not* ὁμοειδής – differs in species or in genus, I take to be a question about the correct classification of soul kinds, and especially νοῦς. It is difficult to see, however, how souls could differ in genus, a complaint raised by Gerson (2004, 352, n. 17). A solution may be found in *Metaph* I.10, 1058b36–1059a10, where Aristotle claims that what is perishable (τὸ φθαρτόν) and what is imperishable (τὸ ἀφθαρτόν) cannot be contained under the same genus. In *DA* 2.2, 413b24–7, Aristotle will claim that mind seems to be a different genus of soul, precisely for the reason that it seems to be ἀφθαρτόν.

² Pace Charlton (1991, 170). The term ὁμοειδής does not occur outside of *DA* 1.

³ Despite the fact that the term ὁμοειδής – usually translated as ‘homogenous’ or ‘same in kind’ – is foreign to Plato's works, as is the related term, ὁμοιοειδής.

nature of anything, we must discover whether it is ‘simple or multiform’ (ἀπλοῦν ἢ πολυειδές), and then consider, with respect to its forms, what powers they have, and in relation to what things, it can act or be acted upon.⁴ Hence, to speak accurately about the soul, claims Socrates, one needs to say whether it is ‘one and all alike’ (ἓν καὶ ὁμοιον) by nature, or ‘multiform’ (πολυειδές) like the parts of the body.⁵

In the *Phaedo*, Plato has Socrates try to supply an answer to whether soul is ‘one in kind’ or ‘uniform’ (μονοειδής). Socrates says that soul is by nature *like* the Forms – each of which is μονοειδής – but that it (in some undefined way) is not fully μονοειδής because of its association with the pleasures and pains of the body.⁶ In a similar manner, although he claims in *Rep.* 4 that the soul is divided into at least three different parts – the appetitive, spirited, and rational part –⁷ in *Rep.* 10, Plato hints that it is not multiform (πολυειδής) after all,⁸ but is like the sea-god Glaucus, whose true nature is obscured by the shells and seaweed and stones that have attached themselves to his body.⁹

Plato’s description of soul within these works suggests that he favours the view that it is essentially μονοειδής, and that it only appears or contingently becomes πολυειδής in virtue of its association with the body.¹⁰ This view of soul (unlike, for example, the doctrine of the *Timaeus*) suggests that it is *not* essentially divisible into soul kinds, and that should we find different kinds of soul, or different parts of soul (e.g. the appetitive part) in living things, such kinds or parts are best viewed as accidental. Such a unitary soul – if it could exist apart from the body (as Plato argues) – would lose these pluriform features. Aristotle, in contrast to Plato and other earlier Greek psychologists, will argue that the soul is *not* a uniform kind of entity.

I first show that Aristotle advances two important arguments for thinking that the term ‘soul’ does not refer to a uniform kind (Section 9.2). I then show how these arguments call into doubt an Orphic theory about the origin of the soul (Section 9.3), as well as a related panpsychist theory, probably advocated by Archelaus, that soul is mixed throughout the universe (Sections 9.4–9.6). I conclude by showing how these arguments

⁴ *Phaedr.* 270d1–7.

⁵ *Phaedr.* 271a4–8.

⁶ *Phaedr.* 83d4–e3.

⁷ Cf. *Rep.* 4, 435b9–c6.

⁸ Cf. *PA* 2.10, 656a1, where Aristotle claims that the soul-principle in plants is not πολυειδής.

⁹ *Rep.* 10, 611a10–612a6.

¹⁰ Cf. Shields (2010).

solve the puzzle about the soul's uniformity and lay the groundwork for Aristotle's *Non-Uniformity Thesis*. I argue that this thesis affects how we understand Aristotle's general *Hylomorphic Thesis*. This is because the general definition of soul it supports suggests that soul is a uniform kind, when in fact Aristotle thinks that there are at least three different kinds of soul. This implies that different kinds of soul will not have the same essential definition, although they will have general overlapping definitional components, such as 'first-fulfilment' (Sections 9.7 and 9.8).

9.2 The Missing Capacity Arguments

We have seen that Aristotle predominantly uses his demonstrative heuristic to test whether earlier definitions and theories of soul can explain either its *per se* attribute of producing motion, or its *per se* attribute of producing cognition. However, what of living beings that have one, but not the other of these attributes? Aristotle tackles this problem head on in *DA* 1.5. He writes:

But all of them – both those who claim that the soul is composed of elements because it is able to perceive beings, and those who claim that soul is what is most able to initiate motion – do not account for every soul. For not all animals that perceive (τὰ αἰσθανόμενα) are animals that can move (κινητικοί); for there appear to be certain animals that are stationary with respect to place; and yet it seems that, among the varieties of motion, it is with respect to local motion alone that the soul moves the animal (κινεῖν ἢ ψυχὴ τὸ ζῶον). (*DA* 1.5, 410b16–21)

Aristotle here challenges the idea that both of the soul's the *per se* attributes – perception and motion – belong to every ensouled thing. His evidence is empirical: he appeals to the existence of certain animals, such as sea-urchins, which are able to perceive, but are incapable of initiating their own local motion.¹¹ If the earlier Greek psychologists were collectively right about the soul's *per se* attributes, then they need to explain why sometimes one of these psychological capacities is missing in living things.

Certainly, Aristotle's predecessors may have rejected either of these initial *explananda*. They might have believed, for example, that souls produce local motion, but not perception. For such thinkers, sea-urchins would count as inanimate (despite the fact that they perceive). Similarly, they might have believed that the soul causes perception, but not local motion. However, since Aristotle does not think that any earlier thinkers argued

¹¹ Cf. *PA* 4.5, 681b34; *PA* 4.7, 683b4–11.

in this way, his objection can be taken to be a fair one, and to reveal a real structural and explanatory defect in earlier psychological accounts.¹²

Aristotle also has another worry about the completeness of the list of *per se* attributes granted by him and his predecessors to belong to the soul. We saw it hinted at in his criticism of Xenocrates, when he drew attention to the fact that plants are alive, despite the fact that they do not seem to move from one place to another or to perceive. He raises a similar point in *DA* 1.5, when he writes:

But a similar objection applies to those who make mind (νοῦν) and the perceptive capacity (αἰσθητικόν) out of the elements. For it appears that plants live (ζῆν) although they share neither in locomotion nor¹³ perception, and many animals do not possess discursive reasoning (διάνοιαν). (*DA* 1.5, 410b21–4)

Here Aristotle provides a further indication that earlier Greek thinkers, by focusing only on the phenomena of the soul's production of local motion and cognition, may have overlooked a further basic *per se* attribute of soul, namely, its production of life in plants. Although he does not identify it here, he will later claim that this is the capacity for nutrition, which all living things (with the possible exception of divine beings) possess. The importance of this argument in its present context, however, is that it neglects to identify the capacity in question, but instead opens up an avenue of inquiry that will eventually lead to its discovery.

9.3 The Orphic Theory of Soul

However, Aristotle also approaches the question of the soul's uniformity in another way, by looking to earlier explanations (including religious explanations) of how things become ensouled. In doing so, he discovers that some of these accounts, in virtue of their explanation of how things acquire soul, are also unable to account for why some living things lack one of the soul's *per se* attributes. One of these accounts is put forward in the religious teachings of Orphism. He writes:

This problem also applies to the account in the so-called 'Orphic' verses. For he says that the soul is breathed in (ἀναπνεόδων) and enters from the 'whole' (τοῦ ὅλου), being carried by the winds. But this cannot occur for plants and even some animals, if not all of them breathe.¹⁴ But this remained unnoticed by those who supposed this view. (*DA* 1.5, 410b27–411a2)

¹² Cf. *DA* 1.1, 402b3–5, where Aristotle suggests that this oversight is due to the fact that his contemporaries tended to investigate only human soul.

¹³ Cf. Torstrik (1863, 130).

¹⁴ Fish, for example. Cf. *DA* 2.8, 421a3–6; *Resp.* 21, 480b12–20.

Aristotle's criticism here is problematic, for we know from the discovery of the Derveni papyrus, written around the end of the fifth century BCE, that the Orphic verses were taken in some circles to be best interpreted as allegories of philosophical truths. The Derveni papyrus, by drawing upon these allegorical devices, attempts to reconcile certain Orphic verses (which may or may not belong to the same texts as the verses Aristotle mentions here) with the teachings of Anaxagoras.¹⁵ Although Aristotle is certainly familiar with this strategy, as evidenced in his concerns about allegorical and literal interpretations of the *Timaeus*,¹⁶ he does not countenance this kind of interpretation in respect of the Orphic verses.

However, we need not fault Aristotle on this point, for he might be dealing precisely with Orphic devotees who did interpret these verses literally. For an Orphic devotee of this stripe, Aristotle's criticism of their respiration-based theory of the origin of soul might serve the purposes of making them question whether Orpheus, or the natural scientist, has a better explanation of the soul's origin. His criticism of Orphism also serves as an objection to other respiration-based psychologies with which he is concerned. For instance, the Pythagoreans are reported by him to have claimed that the soul is like motes (ξύσματα) in the air (or something in the air that moves the motes),¹⁷ and Democritus, as we have already seen, thinks that respiration is necessary for keeping bodies ensouled.¹⁸ Diogenes of Apollonia, as well, also holds such a theory.¹⁹ The fragments of his work suggest that he, like the writer of the Orphic verses, defends a theory of the soul's all-pervasiveness through an appeal to the process of respiration. He asserts that:

Men and other animals live in virtue of air through breathing (ἀναπνέοντα).
And this is to them life (ψυχὴ) and thinking (νόσις). (DK64 B4 = TEGP 7[F4])

However, he is also partly immune to Aristotle's criticisms, as he also held that, since plants cannot breathe, they cannot have intelligence.²⁰ Whether

¹⁵ See Betegh (2004).

¹⁶ See Carter (2017).

¹⁷ *DA* 1.2, 404a17–19.

¹⁸ *DA* 1.2, 404a9–16. See Chapter 4. One might also add Homer to the list of respiratory theorists, since in *Il.* 5.694–98 he describes how the soul (ψυχὴ) of wounded Sarpedon left him as Pelagon removed the spear from this thigh, but revived (ἐμπνύνη) once the breath (πνοή) of the north wind blowing round him, gathered back the spirit (θυμὸν) he had breathed out (κεκαφῆτο) during his suffering.

¹⁹ His air theory of soul is discussed in *DA* 1.2, 405a21–5.

²⁰ DK64 A19 = TEGP 30.

Aristotle's criticism is a good one depends upon whether the Orphics, and other respiration theorists like Diogenes of Apollonia and Democritus, took the *perceptible* phenomenon of breathing to be essential to their explanation of becoming ensouled.²¹ A respiration theorist might, for instance, think that some things, such as plants, do not take in soul-filled air through breathing, but through a different but analogous mechanism, such as 'absorbing' soul-filled air.

While nothing precludes this possibility, in the case of the respiration theories that Aristotle discusses in *De Anima*, the observable phenomenon of breathing is essential to their explanation of how soul enters (and stays within) the body. Democritus' explanation of respiration, for instance, essentially involves a certain balancing of internal and external air pressure. This mechanism of life has no perceptible analogue in plants.²² A respiration-based explanation of how creatures that live under water absorb air would have also been difficult for an ancient scientist to construct.

Thus, by means of his criticism of the Orphic theory of soul, Aristotle is able to suggest that no respiratory theory of soul, religious or otherwise, is able to explain why some non-breathing bodies (e.g. plants) have souls, and others do not. The Orphic theory of soul implies, in contrast, that only bodies that breathe have souls. Aristotle takes this to be in conflict with the phenomena associated with the biological extension of 'ensouled beings'.

9.4 Soul as an Independent Element in a Mixture

Aristotle also links the Orphic respiration theory of soul to another group of psychological theorists who were inspired by an ancient view that soul was 'mixed' (μεμῖχθαι) throughout the cosmos.²³ Like the Orphic verses, these thinkers are treated as having offered a theory of the origin of *life*. Aristotle's discussion of this unusual mixture theory begins as follows:

And what is more,²⁴ some others claim soul to have been mixed (μεμῖχθαι) throughout the whole cosmos (τῷ ὅλῳ),²⁵ from whence perhaps Thales supposed all things to be 'full of gods' (πάντα πλήρη θεῶν εἶναι). (*DA* 1.5, 411a7–8)

²¹ I thank Lindsay Judson for this point.

²² Cf. *DA* 1.2, 404a9–16.

²³ I here pass over *DA* 1.5, 411a2–7. Following Bywater (1888, 52–4), I take it that this text interrupts the argument and is out of place.

²⁴ I here accept Bywater's restoration of δὴ for δέ, on the assumption that Aristotle's discussion is meant to follow on from his discussion of the Orphic verses.

²⁵ The reference here must be to the universe as a whole. Cf. *DC* 1.9, 278b18–21.

Unfortunately, Aristotle nowhere identifies the group of theorists he is responding to here.²⁶ Since he claims that Thales took inspiration from this view, this suggests that he is appealing to a tradition which is as old or older than the sixth century BCE. However, his subsequent discussion of the doctrines connected to this view imply that he has a more recent thinker in mind, who took this older tradition as authoritative.

To get a better understanding of the view on offer, we need to remember that, for Aristotle, for something to be an ingredient in a mixture, it must (i) exist prior to that mixture and (ii) be a kind of thing capable of coming into physical contact with whatever it is mixed with.²⁷ If so, his target is likely a theorist who held that soul is in some way independent of the known elements, but itself a type of extended or material thing. This suggests that the theory on offer is not a monistic one, such as that of Diogenes of Apollonia, who viewed soul as the product of a certain rarefaction of air, not something 'mixed' into it.

Since this mixture theory seems textually and philosophically connected to the Orphic theory of the soul, this suggests that it is based upon a respiratory theory of soul. One might suspect that it is Anaxagoras who is on trial here, but there is no real tradition connecting him to a respiratory theory of soul. Furthermore, it especially goes against the spirit of his philosophy to say that mind was mixed throughout the whole.²⁸

However, there is a chance that Aristotle has in mind one of Anaxagoras' followers belonging to the tradition of Orphism connected to the Derveni papyrus. This is the relatively unknown philosopher, Archelaus.²⁹ Although Aristotle does not mention this Presocratic by name in *DA* 1.2, we know he departed from Anaxagoras precisely in affirming that mind (*νοῦς*) *does* have some mixture (*μῖγμα*) in it.³⁰ If we take this claim to be equivalent to the claim that mind was mixed with something else, we know from Anaxagoras what consequence is supposed to follow: mind would straightaway be mixed with all things (since everything has a share in everything).³¹ Indeed, as we shall see,

²⁶ Pace Ross (1961, 209).

²⁷ *GC* 1.10, 327b20–1. See Chapter 6, Section 6.4.

²⁸ See Chapter 9, Section 9.4.

²⁹ DK60 A1. I thank Gábor Betegh for first suggesting this possibility to me.

³⁰ DK60 A4. Cf. KRS 385–89.

³¹ DK59 B12 = TEGP 31[F15].

there is a further argument purportedly offered by the mixture theorists that suggests that Archelaus is indeed the target here.³²

9.5 The Elemental Animal Dilemma

Aristotle begins his criticism of the unknown mixture theorists by means of an argument about the extension of the term ‘animal’. He writes:

But this doctrine contains certain puzzles; for what explains why (διὰ τίνα γὰρ αἰτίαν) the soul which is in air, or in fire, does not make an animal, but only the soul in the mixtures [of those elements] (μικτοῖς), even though the elements going into the mixtures seem to be better (βελτίων)? (One might also investigate the reason why the soul in the air is better and more eternal (ἀθανατωτέρα) than the soul in animals.) Both ways of answering [the former question] are either absurd (ἄτοπον) or unreasonable (παράλογον). For to say that fire or air *is* an animal (ζῷον) is very unreasonable (παράλογωτέρων), but not to say that they are animals when they have soul in them is absurd (ἄτοπον). (*DA* 1.5, 411a9–16)

In this dilemma, Aristotle alleges that if all it takes to make an animal is to have a soul, and soul is mixed throughout every part of the cosmos, then a mixture theorist should be committed to the idea that every element and every elemental mixture is an animal. His parenthetical question also assumes that there is a tension within the theory, namely, that it holds there can be greater and lesser degrees of soul purity and life-span, depending on the nature of the element in which the soul is mixed. In the extreme case, it seems, if the soul resided in a pure airy element, it would be immortal.

Aristotle’s objection is not that the term ζῷον cannot be applied to the elements; rather, just as in his criticism of Empedocles’ panpsychism, it is that if we accept this mixture theory, we would be unreasonably forced to deny the initial *explananda* of Aristotle’s psychological inquiry, namely, the attributes marking out the difference between animate and inanimate things.³³ Conversely, since it is analytic that ζῷα are ensouled things, *sans*

³² Another possibility is that Aristotle has a Pythagorean view in mind. There is one piece of internal evidence that suggests this: the only parallel in *De Anima* to Aristotle’s description of the soul being ‘in’ an element, such as ‘in air’ (ἐν τῷ ἀέρι), or ‘in fire’ (ἐν τῷ πυρί), occurs in his description of the respiratory theories of the Pythagoreans and Democritus. However, the evidence for the mixture view on offer here being either a Democritean or a Pythagorean one is weak.

³³ *DA* 1.2, 403b25–7.

further justification, to deny that the elements, if ensouled, are ζῶα, would be like claiming that not all unmarried men are bachelors.

9.6 Parts of the Universe vs. Parts of the Soul

In offering a possible explanation for how these mixture theorists came to believe that the soul is mixed throughout the elements in the universe, the evidence that Aristotle has Archelaus in mind becomes stronger. His explanation suggests that there was an argument propounded by the mixture theorists that justified them in asserting the soul to be a uniform kind wherever it exists in nature. He writes:

But they seem to have supposed the soul to be in those things [*sc.* the elements] because (ὅτι) they held that any [elemental] whole (τὸ ὅλον) is uniform (ὁμοειδές) with its portions (μορίοις);³⁴ Hence it is necessary for them to claim that soul is uniform with its portions as well, if it is by some portion of what surrounds (τοῦ περιέχοντος) being cut off and enclosed (ἀπολαμβάνεσθαι) inside animals that they become living beings. But if air that is split up is uniform (ὁμοειδής), but the soul consists of unlike parts (ἀνομοιομερής),³⁵ then it is clear that some soul will belong to the air, but some soul will not belong. So it is necessary for soul either to consist of like parts (ὁμοιομερῆ), or to not be in any random portion whatsoever of the whole (τοῦ παντός). (*DA* 1.5, 411a16–23)

Aristotle's argument is difficult to interpret on both logical and textual grounds.³⁶ The first difficulty is that it is unclear why, if soul is mixed throughout all the elements, as the mixture theorists are reported to have held, Aristotle seems to focus specifically on air. The second difficulty is how the criticism is to be reconstructed. It is not apparent whether he is criticising the mixture theorists for falsely believing that soul is uniformly mixed throughout the cosmos, or showing that a false belief in a uniform soul is entailed by their true belief that the elements are uniform, in combination with their false belief that it is by cutting off a piece of a surrounding element (e.g. air) that a thing becomes ensouled.³⁷

³⁴ Cf. *Metaph.* Δ.25, 1023b17–19; *Metaph.* Δ.3, 1014a30–1. Importantly, Aristotle takes the thesis that any *elemental* whole is uniform with its parts to be *true*, while he takes the principle that every whole in general is the *same* (ταυτόν) as the sum of its parts to be *false* (cf. *Top.* 6.13, 150a15–16).

³⁵ Typically, this term refers to the parts of the body that are distinct from one another. Cf. *HA* 4.1, 523a31; *PA* 1.1, 640b20–1; *PA* 2.2, 647b21.

³⁶ The difficulty of the passage is pointed out by Themist. (*Paraphrasis in de Anima* 36.20–21). After providing his own sophisticated exegesis, he feels compelled to brag that 'Those who came before us failed to gain a mastery over this text, as anyone who wishes to can easily confirm.'

³⁷ As Philop. (*In de anima*, 190.8–10) recognises.

The first difficulty can be resolved by noting that the mixture theory of soul described here leaves open how thoroughly, or in what proportions, something can mix with something else. The theorists in question may, for instance, have thought that soul is mixed into the whole cosmos, but mixed better with air or fire, such that these elements, post-mixture, can manifest more of the soul's powers than, for example, earth. This idea is consistent with Aristotle's description of an animal cutting off a portion of its surrounding (περιέχοντος), a term which, in *DA* 1.2, seems to be used exclusively of surrounding air. This would indicate that the mixture theorists held that a piece of a 'finer' element (for example, a portion of air) can become enclosed in a 'thicker' element (for example, earth), perhaps in the way Aristotle thinks that πνεῦμα can be cut off and enclosed in something (ἐμπεριληφθῆ) so as to produce life spontaneously.³⁸ On this picture, a mixture theorist might plausibly hold that, whilst all the elements may have a portion of soul, there are elements in which soul stuff is more plentiful.

The second difficulty is harder to resolve. Historically, two different interpretations of this criticism have been offered. The first reading, offered by Themistius and adopted by Aquinas, has Aristotle arguing that the mixture theory is internally contradictory with respect to its claims about the airy soul of animals, and its claims about the surrounding (or cosmic) air. The second reading, offered by Philoponus, has Aristotle arguing that the mixture theory is explanatorily inadequate, insofar as it cannot account for the 'parts' of souls in plants, animals, and humans.

Philoponus' interpretation seems to be the right one.³⁹ It takes Aristotle to be relying upon his demonstrative heuristic, and building upon his previous missing capacity arguments. On this interpretation, Aristotle claims that, because every elemental whole *is* uniform with its portions (a view Aristotle accepts as true), a mixture theorist who defines the soul as an elemental stuff mixed into every other bodily element cannot deduce or explain why some ensouled things lack some *per se* attributes of soul, despite taking in the same uniform air through breathing.

However, on either reading, Archelaus comes out as the most likely defender of the reasoning Aristotle ascribes to the mixture theorists here. Since he was committed both to Anaxagoras' principle that 'everything

³⁸ Cf. *GA* 3.11, 762a18–27.

³⁹ Cf. Philop. (*In de anima*, 190.14–191.10).

has a share in everything', and to the idea that 'mind' is not an exception to this principle, he would plausibly think it necessary, as Aristotle says, to hold that the soul – interpreted as mind – is everywhere uniform.

9.7 The Solution to the Puzzle of the Soul's Uniformity

Although Aristotle does not state it outright, the arguments covered above constitute a solution to the fourth puzzle of *DA* 1.1. This puzzle asks whether soul is a uniform kind or not. Since the *per se* attributes of a kind *K* belong to it necessarily, and Aristotle has just argued that one, or the other, or both of the soul's *per se* attributes do not belong to some living things, Aristotle's answer to this puzzle must be 'no'. Hence, any account of soul that makes both perception and cognition into *per se* attributes of *every* soul cannot be right, nor can any account which leaves out any *per se* attribute, such as the attribute in virtue of which plants live.

Taken together, Aristotle's arguments show that the idea of soul as a single, uniform kind of thing is not consistent with, nor explanatory of, the fact that some things lack one or more of the soul's *per se* attributes, including the attribute of producing life in plants. There now seem to be two possibilities left with respect to giving the right definition of the soul. Either (i) one must accept that 'soul' is a homonymous term used to designate different and *unknown kinds* – one of which causes motion, one of which causes perception, and another of which causes life in plants,⁴⁰ or, (ii) one must accept that each of these *per se* attributes belongs to one or more *kinds of soul*, which kinds belong to a single psychological genus (or to genera that are related to one another in some necessary way).

These latter problems are reflected in the fifth and sixth puzzles of *DA* 1.1.⁴¹ In these puzzles, Aristotle asks whether or not a single account (*λόγος*) can be given of all soul, or whether different accounts must be given for different kinds of soul, either at the level of genus (for example, between plants, animals, and gods) or at the level of species (for example, between horse and dog). Aristotle's missing capacity arguments provide the empirical and explanatory reasons for why these definitional problems need to be addressed during the course of his psychological inquiry.

⁴⁰ Cf. Johansen (2012, 48).

⁴¹ *DA* 1.1, 402b2–9.

9.8 The Results of Aristotle's Solution

These detailed objections negatively constrain Aristotle to adopt the counter-intuitive *Non-Uniformity Thesis*, introduced in *DA* 2.3, that there is not a single kind of entity called 'soul' in nature. However, there is a consequence of doing so for Aristotle's *Hylomorphic Thesis*. In order for a common definition of soul to be justified, Aristotle says, one has to take this definition as analogous to the definition of 'figure'. He writes:

So it is clear that there will be one definition (λόγος) of soul in the same sense as there is one definition of 'figure' (σχήματος). For there is no figure apart from triangle and the figures which succeed it, nor is there 'soul' apart from the ones spoken of [*sc.* nutritive, perceptive, and rational soul]. But a common account might be given even in the case of figures, which would harmonise (ἐφαρμόσει) with all of them, but be proper (ἴδιος) to none. And similarly, this would apply to the souls (ψυχᾶς) spoken of. (*DA* 2.3, 414b20–5)

This result follows from Aristotle's arguments in *DA* 1.5 that no earlier thinkers who provided a definition of soul were able to explain why its *per se* attributes are distributed unevenly to ensouled things. If the soul had turned out to be a uniform entity or stuff, a single common definition would have harmonised with and been proper to all soul. However, Aristotle's missing capacity arguments, along with his criticism of respiratory theories of the soul, have shown this to be an illusion.

This does not mean, however, that the definition of soul as the 'first-fulfilment of a natural instrumental body' that Aristotle proposes in *DA* 2.1 falls prey to the demonstrative heuristic, such that it too is empty and dialectical. For he admits that this definition does harmonise, in a general way, with all soul. The problem is that it is not determinate enough to explain what *per se* attributes each kind of soul has in different broad classes of living things. This means that a psychologist must, for each individual kind of living thing, determine what bodily instruments and capacities the soul is a fulfilment *of*. Aristotle's general hylomorphic definition of soul, in this sense, can be seen as plastic in a way that none of his predecessors' definitions are. 'Fulfilment' serves as a definitional principle that can explain both the fulfilment *of* the capacity for motion, and the fulfilment *of* the capacity for perception, as well as *of* any other capacity that the soul of a living being might have, such as the capacity for nutrition.

Thus, Aristotle provides a negative answer to the fourth puzzle of *DA* 1.1 about whether soul is uniform in kind. He shows that none of his

predecessors' accounts of soul, taken singly or in combination, are able to explain all the non-uniform psychological phenomena that appear in nature in a way that is consistent with the demonstrative heuristic. His discussion of the Orphic theory of the soul, and his discussion of the mixture theory of soul, give further evidence for his claim that soul is not uniform. These arguments show that even origin theories of the soul that do not attempt to explain directly the soul's motive or cognitive capacities still have problems explaining how the soul can manifest itself in different kinds of living things. Aristotle's arguments about the non-uniform nature of the soul also help to show why the *Hylomorphic Thesis* is not sufficient on its own to explain the soul's *per se* attributes. This definition is too general to explain the particular kinds of capacities that different living beings manifest in nature. For this reason, Aristotle claims that, once we have determined that the souls of individual kinds of living beings are in general formal substances, we must go on to determine what specific kind of formal substances they are. This is because, in order to demonstrate the specific *per se* attributes of a figure, such as the number of angles a hexagon has, it is not sufficient to know the definition of figure in general. Similarly, in order to demonstrate the specific *per se* attributes of a human soul, such as its power to think, it is not sufficient to know the definition of soul in general.⁴²

⁴² Cf. *DA* 2.2, 413a20–5; *DA* 2.2, 413b11–13.

The Puzzle of the Soul's Divisibility

Moreover, I saw that the gravity, while remaining coextensive with the heavy body, could exercise all its force in any one part of the body... This is exactly the way in which I now understand the mind to be coextensive with the body – the whole mind in the whole body and the whole mind in any one of its parts.

Descartes, *Sixth Set of Replies*

10.1 Introduction

As we saw in the last chapter, Aristotle investigates earlier definitions of the soul not only with a view to seeing whether they can demonstrate the soul's *per se* attributes, but also with a view to seeing whether they can help to resolve general philosophical puzzles that pertain to its nature. Another puzzle about the soul that Aristotle will solve through his investigation of earlier Greek psychologies is the puzzle of whether it is divisible (μεριστή) or indivisible (ἀμερής) into parts.¹

Because the Greek for 'divisible into parts' (μεριστή) and 'indivisible into parts' (ἀμερής) are both cognates of the Greek word for 'part' (μέρος),² and Aristotle uses the terms 'part' (μέρος) and 'part/portion' (μόριον) interchangeably,³ one might think that Aristotle's puzzle is ambiguous

¹ *DA* 1.1, 402b1. Whilst some commentators, for example, Hicks (1907) and Bastit (1996), have supposed that this question can be treated as equivalent to Aristotle's puzzle of whether the soul has 'parts' (μόρια) (*DA* 1.1, 402b9–10) in the sense of essential capacities, I argue here that these puzzles are logically distinct. The former interpretation dates back to Alexander's lost commentary *apud* Philop. (*In de anima*, 35.9–11). Cf. Alex. *De Anima* 30.26–31.5. Cf. Bastit (1996, 14); Whiting (2002); Corcilius and Gregoric (2010); Johansen (2012, 47–8).

² Cf. *Metaph* Δ.25. Cf. Bonitz (1955, 454 s.v. μερίζειν) and (1955, 454 s.v. μέρος).

³ Either term can refer to the parts of an animal (cf. *DA* 2.1, 412b1; *PA* 1.1, 640a35), the parts of the soul (cf. *DA* 3.10, 433b1; *PA* 1.1, 641a17–27), or the parts of a genus or species (cf. *Metaph* Δ.25, 1023b18–25).

as to what sort of 'parts' the soul might be divisible into. However, this inference is mistaken. In the *Physics*, Aristotle defines being ἀμερής – the opposite of being μεριστός – as 'being unable to be divided with respect to quantity'.⁴ Indeed, throughout his *corpus*, Aristotle uses the adjectives μεριστός and ἀμερής (with one possible exception)⁵ to describe something which is divisible or indivisible *in quantity*. This could be a spatial quantity,⁶ a temporal quantity, or a numerical quantity.⁷

I shall argue here that, when Aristotle puzzles about whether soul is divisible into parts or not, he is asking whether it can be divided up *spatially* – into, for example, half a soul. Although one might think that Aristotle already ruled this out in declaring against the *Timaeus* that the soul is not a magnitude,⁸ his discussion in *DA* 1.5 shows that he thinks that the soul might still be subject to being *indirectly* spatially divided, namely, by being split into parts when the body it resides in is split into parts. I shall call any part that can be produced by such an (imaginary or physical) spatial division a *spatial-part*. In contrast, I shall call any part that cannot be divided in this way a *capacity-part*.⁹

Understanding the conceptual difference between capacity-parts and spatial-parts is crucial for understanding Aristotle's puzzle about the divisibility of soul; for, if the soul has spatial-parts, it need not have distinct capacity-parts. Conversely, if the soul has distinct capacity-parts, it need not have spatial-parts. Soul might, for example, have no spatial-parts, and yet still have distinct (or be virtually divisible into) capacity-parts; or it might have spatial-parts, and yet not have distinct capacity-parts (e.g. if the soul was simply motion producing, a paralysed limb might be said to lack a spatial soul part).¹⁰

⁴ *Phys.* 6.10, 240b12–13: ἀμερὲς δὲ λέγω τὸ κατὰ ποσὸν ἀδιαίρετον. The list of meanings in Bonitz (1955, 38 s.v. ἀμερής) confirms that Aristotle has no other use for this term other than the exception mentioned. This term is thus more specific than ἀδιαίρετον, which can be used to cover quantitative division or division into species (cf. *DC* 3.1, 299a17–24).

⁵ At *APo* 2.19, 100b2, Aristotle uses τὰ ἀμερῆ to refer to the highest universals, i.e. the categories. But as Ross (1949, 678) points out, elsewhere, Aristotle uses τὰ ἅτομα. If one were to speculate, one might think that Aristotle's technical vocabulary here was still Platonic.

⁶ For example, *DA* 1.3, 407a19. Being ἀμερής is explicitly contrasted with having magnitude at *Metaph.* Λ.7, 1073a6–7, *Phys.* 8.10, 266a10, and *Phys.* 8.10, 267b25–6.

⁷ For example, *DA* 1.4, 409a2.

⁸ *DA* 1.3, 407a2–3.

⁹ Cf. *DA* 1.1, 402b10–13; *NE* 1.13, 1102a27–32.

¹⁰ Unless one thinks that the 'whole' of soul can also be a 'part', a thesis which Aristotle seems to accept. Cf. Corcilius and Gregoric (2010). In classical mereology, this is called an 'improper part'. Cf. Haslanger (1994).

That Aristotle holds that the question of whether the soul has spatial-parts (i.e. if it is μεριστή) is conceptually distinct from the question of whether it has capacity-parts, finds confirmation in the fact that he appeals to *both* types of parts in order to ask, and solve this question. He attempts to do so by investigating what happens to the soul's capacities in certain plants and animals when their bodies are spatially divided.

I first discuss the Platonic background to this puzzle, and Aristotle's attempt to cast doubt on one Platonic solution to it (Sections 10.2–10.6). I then show that Aristotle offers a preliminary answer to his puzzle about the soul's divisibility, namely, that some kinds of soul (i) *are* spatially divisible into further whole souls which have (one or more) distinct capacity-parts, but (ii) *are not* spatially divisible into those distinct capacity-parts.¹¹ This, I argue, negatively constrains Aristotle to adopt his *Part-Hood Thesis* (Section 10.7). I go on to show that the results of Aristotle's investigation indicate that the nature of the soul's parts cannot be explained by the principle that each 'part' is spatially confined to separate places in the body. This result is later used as the starting point for a further investigation into what capacity-parts the soul has, and whether all such capacity-parts, such as the capacity of mind, are inseparable from the body and from one another (Section 10.8).

10.2 A Platonic Puzzle about Soul-Parts

Aristotle raises his puzzle about the soul's divisibility in the context of a general overview of the negative results of his investigation into earlier Greek psychology. He writes:

So it is apparent from what we have said that it is not in virtue of being derived from the elements that the power of cognition (τὸ γινώσκειν) belongs to the soul (ὑπάρχει τῇ ψυχῇ), nor is it correct or true to say that the soul is moved (κινεῖσθαι). But since the power of cognition does belong to the soul (τὸ γινώσκειν τῆς ψυχῆς ἐστὶ), as well as the power of perceiving (τὸ αἰσθάνεσθαι), opining (τὸ δοξάζειν), irrational appetite (τὸ ἐπιθυμεῖν) and wishing (βούλεσθαι), and desires generally (ὅλως αἱ ὀρέξεις), and since motion with respect to place as well is produced in animals by the agency of soul (ὑπὸ τῆς ψυχῆς), along with growth, maturity, and decay, a question arises as to whether each of these belongs to the whole soul (ὅλη τῇ ψυχῇ), such that we think (νοοῦμεν) and perceive (αἰσθανόμεθα) and are moved (κινούμεθα), and along with each of the rest, we both act and suffer (ποιοῦμέν τε καὶ πάσχομεν), or do we do each different thing with a

¹¹ Pace Charlton (1991, 170).

different part (μορίοις ἑτέροις ἑτέροα) [of soul]? And does the power of living (τὸ ζῆν) belong to some one of these parts in particular, or to more than one, or to all of them, or could life have some other cause (ἄτιον)? (*DA* 1.5, 411a24–b5)

Contrary to a standard view of hylomorphic psychology, which holds that souls are not the proper subjects of any attributes,¹² here Aristotle reaffirms that, even though the soul does not cognise in virtue of being elemental, and even though it is not a proper subject of being-moved, it is still the proper subject of its own cognitive and motive *per se* attributes – even if it shares these attributes in common with another subject, the body.¹³ However, his reaffirmation brings with it a puzzle about the relation of these attributes to the structure of the soul.

It is important to note that Aristotle's question does not assume that any of the psychological activities listed is a 'part' of the soul. If it did, his puzzle here would turn out to be a version of another puzzle from *DA* 1.1, which concerns what soul parts are distinct from one another by nature.¹⁴ In contrast, the question here concerns whether we should understand different psychological activities as being performed *by* (i) a distinct part of the soul, or (ii) by the whole soul.

Of course, Aristotle's investigation could have resulted in the discovery that every activity of soul is performed by a different soul part.¹⁵ If so, every psychological capacity would turn out to be a soul part. But so far, he has only explicitly mentioned *three* candidates for psychological parts – mind (νοῦς), the perceptive capacity (αἰσθητικόν),¹⁶ and an unnamed part by which plants live. Thus, Aristotle is not concerned here with *what* parts the soul has, but with *how* the soul's activities are related to the soul itself conceived of as a potentially divisible whole.

Aristotle's question is certainly meant to evoke *Rep.* 4, where Plato discusses an almost identical problem. He writes:

But it is difficult to determine if it is with the same thing [in soul] that we perform each of these [actions], or since they are three, if we do one action by one thing, and another by another (ἄλλο ἄλλω). For instance, do we learn by one thing (ἑτέρω), and become angry by another (ἄλλω)

¹² On the debate over whether soul can be considered a subject (ὑποκείμενον) of attributes, cf. Shields (1988a, 1995b), and the criticisms of Granger (1995a, 1995b). Cf. *Cat.* 2, 1a26; *DI* 1, 16a3–7.

¹³ For a fuller discussion, see Carter (2018).

¹⁴ *DA* 1.1, 402b9–11.

¹⁵ Aristotle argues against a one-to-one relationship between soul-parts and soul capacities in *DA* 3.9, 432a22–b13. See Johansen (2012, 246–51).

¹⁶ *DA* 1.1, 402b12–13. One might also think that the ὁρεκτικόν is conceived of as a soul part at *DA* 1.4, 408a13, but it is not labelled as such.

of the things in us, and again, by a third one desire those pleasures which concern nutrition and reproduction and as many of those that are kindred to these, or is it with the whole soul (ὅλη τῇ ψυχῇ), relative to each case (καθ' ἕκαστον αὐτῶν), that we perform these actions, whenever we begin to act. (*Rep.* 4, 436a8–b2)

Here, Plato poses the same dilemma as Aristotle: is it (i) by *different parts*¹⁷ of soul that we perform different activities, or (ii) by the whole soul, whatever activity we may be doing? During the course of *Rep.* 4, Plato argues (in a preliminary way) that we should choose horn (i) of this dilemma, on the basis of his so-called ‘principle of opposites’, that the same thing cannot do or suffer opposites in the same respect at the same time with respect to the same things, and the claim that the soul *does* in fact do and suffer such opposite things (e.g. the soul may desire to drink a cup of water, and desire not to drink a cup of water, at the same time). Plato’s approach attempts to distinguish the parts of the soul by discovering which of its powers can be exercised oppositely in the same respect at the same time with respect to the same things.

10.3 The Unity of Soul Challenge

Aristotle, on the other hand, approaches this question differently. He does not argue (even in a preliminary way) for the claim that soul does different things with different parts of itself on the basis of anything like the principle of opposites. Instead, he turns to test out an answer to this question offered by other thinkers. Aristotle claims that ‘some’ people – most likely current and past members of the Academy, including Plato – answered this question by postulating that the soul performs different activities with different spatial parts of itself located in different areas of the body. Aristotle has major concerns with the explanatory power of this thesis. He writes:

Indeed, some (τινες) say that the soul is spatially divisible (μεριστήν), and by one part (ἄλλω) it reasons (νοεῖν) and by another (ἄλλω) it irrationally desires (ἐπιθυμεῖν). So what is it then that holds together (συνέχει) the soul, if it is spatially divisible (μεριστή) by nature? For it is at least not the body which does this; for instead it seems rather that the soul holds together the body; thus when the soul departs (ἐξελεύσεται), the body dissipates (διαπνέεται) and rots (σῆπεται). So if something different [from the body] makes the soul one (μία), *that* (ἐκεῖνο) would be soul most of all. But it

¹⁷ Strictly speaking, Plato does not refer to ‘parts’ here, but ambiguously to a ‘thing’ in the soul.

will be necessary again to investigate if *that* thing is one (ἐν) or complex (πολυμερές). For if *that* thing is one (ἐν), what is the reason why soul is also not straightaway one (ἐν)? But if that thing is also spatially divisible (μεριστόν), again the account will inquire into what makes *it* one, and thus in this way will go on indefinitely (ἐπὶ τὸ ἄπειρον). (DA 1.5, 411b5–14)

Aristotle discusses here a potential answer to the question, namely, that the soul is spatially divisible into two parts – a rational part and an irrational part. These thinkers seem to have taken inspiration from Plato's *Timaeus*, in which Plato claims that there are different kinds of soul, and these kinds of soul are placed into distinct spatial locations in the body.¹⁸ He claims there that the rational part of the soul is lodged in the head, the spirited part in the upper chest cavity, and the appetitive part in the liver.¹⁹ It is the thesis that the soul is divisible into such spatial parts that Aristotle criticises here.²⁰

10.4 Aristotle's Principle of Unity

Aristotle's worry about how the soul will hold together if it is divisible derives from the *Physics*. There, he lays out a general principle of unity such that anything that is continuous and has pre-existing and different spatial-parts needs a source of unity which holds these distinct parts together, and makes it 'one' thing.²¹ For example, sticks can be unified by being tied together, and the parts of model airplanes can be unified by glue.²² Aristotle's challenge amounts to asking what sort of 'glue' binds the spatial-parts of a Timaeian soul together, given that the body is too weak to perform this function. For instance, what would prevent the soul's spatial-parts from separating from one another, or from seeping out of the body?²³

Despite its *prima facie* plausibility, this argument is not devastating for a Timaeian account of soul. It could (at least in principle) be avoided by an Academic who claimed, for example, that every part of soul is intrinsically 'sticky'.²⁴ However, since such a 'sticky part' view does not seem to be a part of the doctrine in question, in lieu of a good explanation of how the

¹⁸ Even so, there is only one reference to these kinds as 'parts' (μέρεσιν), which occurs at *Tim.* 91e6.

¹⁹ Cf. *Tim.* 69e3–72d8.

²⁰ Cf. Bastit (1996, 16–17), who connects the soul division of the *Timaeus* to DA 3.9, 432a15–23.

²¹ Cf. *Phys.* 4.10, 218a3–5. Some Aristotle's claims about unity, as Owen (1961, 95–6) points out, are drawn from Plato's *Parmenides*.

²² *Phys.* 5.3, 227a13–17. Cf. DA 1.5, 410b10–15.

²³ Pace Whiting (2002, 148), who thinks that the regress argument here applies to 'any sort of division of the soul into parts'. This challenge is, however, similar to the arguments of *Metaph.* Z.17, 1041b11–33 and *Metaph.* H.6, 1045a14–b23.

²⁴ I thank Lindsay Judson for this point.

soul's spatial-parts hold together, Aristotle is justified in thinking that this Platonic view of the soul's spatial divisibility stands in tension with the view that a soul is a unified entity.

10.5 The Whole-Part Challenge

Aristotle's question about the unity of the soul's spatial-parts brings him to the problem of how the parts of the soul – whether capacity-parts or spatial-parts – are related to the *body's* spatial-parts. He writes:

But someone might puzzle about what power each of the parts (μορίων) of soul holds in the body. For if the whole soul holds together the whole body, it is fitting also for each of the parts of soul to hold together some part of the body. But this seems to be impossible. For it is difficult even to form an image (πλάσσαι) of what sort of body part mind will hold together, and how it will do so. (*DA* 1.5, 411b14–19)

Here, Aristotle takes up the hypothesis initially suggested in the previous argument: soul is what holds the body together and makes it 'one'. He argues that, if one accepts that the soul's primary activity (along with whatever other activities it performs) is to 'hold together' the body, this suggests that each of the soul's parts – whatever parts it might have – will need to be put into one-to-one correspondence with a part of the body that it holds together. In Aristotle's hylomorphic terminology, this amounts to asking whether each spatial-part of the soul is the form of a specific bodily organ.

In the final lines of the above passage, Aristotle appeals directly to the imaginative component of his demonstrative heuristic. He asks us to assume that every spatial-part of soul exercises a power in some spatial-part of the body, and that mind is a spatial part of the soul. His complaint is that we cannot form an image (πλάσσαι) in imagination of what bodily organ a mind – insofar as it forms concepts, thinks about universal propositions, and grasps demonstrations – would hold together, in the way we might think of the capacity of sight as holding together the eye.

We already saw that Aristotle has good reasons to deny that minds, as capacities to receive the thinkable essences of everything that exists, have bodily organs.²⁵ Here, Aristotle advances a further conceivability argument, which claims that we cannot imagine what such an explanatory connection between mind and a particular bodily organ would look like.²⁶ Aristotle's distancing of mind, as a capacity-part of the soul, from

²⁵ See Chapter 6, Section 6.5 and Chapter 8, Section 8.5.

²⁶ Cf. Philop. (*In de anima*, 199.20–33).

a particular spatial-part of the body such as the heart (or brain), places a further negative constraint on him to affirm the *Separability Thesis*.

So far then, Aristotle has argued that, if the soul has different spatial-parts located at different places in the body, one ought to provide an explanation of its unity that is not based upon the unity of the body; secondly, he has claimed that, regardless of what kinds of parts the soul has, one will need to specify what relation these parts and their powers have to the body's spatial-parts, since not all parts of the soul can be seen as having the function of 'holding together' a particular spatial-part of an ensouled body. What he has yet to do is specify what sort of relation obtains between the parts of the soul (whether spatial-parts or capacity-parts) and the spatial-parts of the body.

10.6 Life in the Division of Body and Soul

Having raised the problem of how the parts of soul are related to the parts of the body, and challenged the solution put forward by certain Academics inspired by the theory of soul we find in the *Timaeus*, Aristotle goes on to provide his own solution to the puzzle of whether the soul is divisible into spatial-parts. He writes:

But it appears that even plants, and some insects, live after having been divided (διαιρούμενα), as possessing a soul which is the same in kind, even if not in number (τὴν αὐτὴν ἔχοντα ψυχὴν τῷ εἶδει, εἰ καὶ μὴ ἀριθμῷ); for each of the parts have perception and move with respect to place for a certain period of time. But if they do not continue to live, this is not absurd. For they do not possess organs (ὄργανα) so that they would continue to preserve their nature (σώζειν τὴν φύσιν). But nevertheless, in each of the [divided] parts (ἐν ἑκατέρῳ τῶν μορίων) all the parts of the soul exist (ἅπαντ' ἐνυπάρχει τὰ μέρη τῆς ψυχῆς), and these two souls are uniform with one another and with the whole soul (ὁμοειδεῖς ἔστιν ἀλλήλαις καὶ τῇ ὅλῃ);²⁷ which implies that the parts of soul are not separable from one another (οὐ χωριστὰ ὄντα), but soul as a whole is divisible (ὡς διαίρετῇ οὕσῃ).²⁸ But even the principle in plants seems to be a kind of soul (ψυχὴ τις); for this alone is shared in common (κοινωνεῖ) between animals and plants, and it is separated (χωρίζεται) from the perceptive principle (αἰσθητικῆς ἀρχῆς), but no being with perception is without it. (*DA* I.5, 411b19–30)

²⁷ Although the MS. tradition is confused here, I here adopt the reading of Jannone and Barbotin (2002) and Hicks (1907, 302–303), the latter of whom offers an exhaustive set of reasons for preferring 'ὁμοειδεῖς ... ἀλλήλαις' to 'ὁμοειδῆ ... ἀλλήλοις'.

²⁸ I here reject Ross's inclusion of οὐ, which is supported by no MSS. except W.

Here Aristotle gives an empirical argument against making a one-to-one correspondence between capacity-parts of the soul and places in the body. As I argued above, the proper interpretation of the argument turns upon the distinction between capacity-parts and spatial-parts. Aristotle's argument shows, against his Academic opponents, that if the soul has capacity-parts, it cannot be the case that these parts are distinguished from one another in virtue of being located in spatially distinct parts of the body, as they would be on the Timaeon picture.²⁹ In particular, Aristotle's argument shows that the parts of soul that produce (a) perception, (b) movement, and (c) growth – in some insects and plants – cannot be separated from one another by spatial division. If this argument is indicative of a more general truth about the soul's spatial relationship to the body, it indicates that the soul is unified in a *non-spatial* way. This is because its capacity-parts may be found together and undivided in two (or more) parts of a living body that has been spatially divided.³⁰

However, how is Aristotle's claim that the soul's capacity-parts cannot be separated from one another by bodily division to be reconciled with his claim that the divided bodies of insects do not continue to live for very long, because they do not have the proper organs to preserve their nature? He must again be thinking of soul along the lines of his earlier craft analogy: soul must use a body as a craft must use the right tools in order to carry out its function.³¹ Without their necessary instruments, neither a craft nor a soul can continue to exercise its powers through a body.³²

10.7 Aristotle's Solution to the Puzzle of the Soul's Divisibility

Thus, although Aristotle accepts that a *whole* soul can, in some cases, be spatially divided into further whole souls existing at separate locations (which both have all of the same capacities or parts as the soul of the original undivided animal), he denies that a soul's different capacities, such as the capacity for perception, and the capacity which makes plants live, are located in distinct and different bodily organs.

²⁹ See Bos (2007, 101).

³⁰ See Johansen (2012, 53).

³¹ See Chapter 2, Section 2.5.

³² This idea is analogous to the argument of *DA* 1.4, 408b18–25, that the organ of vision, but not the power of vision, can be weakened by old age. This assumes that the power of vision belongs primarily to the soul, not to the eyes.

This solution to the puzzle of the soul's spatial divisibility establishes a framework that Aristotle builds upon in *DA* 2.1 and 2.2.³³ In the first of these passages, after arguing that the whole perceptive soul is to the essence of the whole perceptive body as sight is to the essence of the eye, Aristotle argues:

Thus, it is not unclear that the soul, or certain parts of it (ἢ μέρη τινὰ αὐτῆς) if it is spatially divisible (μεριστή) by nature, are not separable (χωριστή) from the body. For of some things, the fulfilment belongs to the [bodily] parts themselves (ἐνίων γὰρ ἢ ἐντελέχεια τῶν μερῶν ἐστὶν αὐτῶν). But nothing prevents some (ἐνιά) [parts of soul], at least, from being separable, if they are not the fulfilment of any body at all. (*DA* 2.1, 413a3–7)

In this passage, one might think that Aristotle is now admitting that each of the soul's capacity-parts (μέρη) is the first-fulfilment of a distinct bodily spatial-part or organ, just as the power of sight is the first-fulfilment of a spatial-part of the body, the eyes. If so, then in contradiction to the solution he gave above, he would be claiming here that the soul is divisible into capacity-parts that are spatially located in different parts of the body.

However, this is to misunderstand the passage. In context, Aristotle is arguing against a specific Platonic thesis, which is that the soul, or one of its 'parts', is separable *from the body*. In contrast, Aristotle thinks he has shown that a certain psychological power, namely sight,³⁴ is the essence *of* a certain organ of the body, the eyes, and that the *whole* perceptive soul is related to the whole body *like* such a power.³⁵ Thus, his argument is that, even if one assumes – with certain Platonists – that the soul has distinct *spatial-parts* that exist in different bodily locations, this thesis does not, in itself, serve as evidence for the soul's separability *from the body*. This is because soul, *per* Aristotle's hypothesis, is the essence of the body in the same way that sight is the essence or 'soul' of the eye, being its natural first-fulfilment. He thinks that the soul's inseparability from the body naturally follows from this. Thus, he countenances, but does not approve of, the idea that the soul has distinct spatial-parts that exist in different bodily places, and he claims that in any case this is not sufficient to show that the soul is separable from the body.

Further, in his *DA* 1.5 solution to the puzzle of whether the soul is divisible into parts, he does *not* claim that the soul, or certain parts of it, are inseparable from the body or a bodily part. Rather, he argues that the

³³ I thank Thomas Johansen and Paolo Fait for this objection.

³⁴ Which is *not* a capacity-part of the soul, but something belonging *to* a capacity-part, namely, the perceptive capacity.

³⁵ *DA* 2.1, 412b18–413a3.

different capacity—parts of soul are not separable *from one another* within some spatially divided animals and plants.³⁶ That solution is consistent with what Aristotle says here.

When a question about the soul's divisibility comes up again in *DA* 2.2, we also find that it is different from the puzzle in *DA* 1.5. Aristotle writes:

But now let it be sufficient to say that the soul is the principle of the capacities we spoke of, and that by these things it is defined, namely, by the capacity for nutrition, perception, reasoning, and local motion. But whether each of these capacities is a soul or a part of soul (ψυχὴ ἢ μέρος ψυχῆς), and if a part (μέριον), whether it is such as to be separable in account only, or also in place (χωριστὸν λόγῳ μόνον ἢ καὶ τόπῳ), concerning some it is not difficult to see, but some present a puzzle. For just as in the case of plants some parts evidently live even when separated from one another, such that the soul in each plant is one in fulfilment, but in potentiality many souls, so also in this way we see other differences (διαφορὰς) of soul occur in insects (ἐντόμων) which have been cut into two; for each of the parts (μερῶν) [of the insect] has perception and locomotion, and if perception, also imagination and desire; for wherever there is perception, there is also pain and pleasure, and wherever these are, from necessity there is also appetite (ἐπιθυμία). But concerning mind and the theoretical capacity (τοῦ νοῦ καὶ τῆς θεωρητικῆς δυνάμεως) nothing is yet apparent, but it seems to be a different genus of soul, and alone capable of being separated (ἐνδέχασθαι χωρίζεσθαι), just as the eternal is from the destructible. But the remaining parts (μέρια) of the soul, as is apparent from what we have said, are not separable in the way that some say (τινὲς φασιν); but it is apparent that that they are different (ἕτερά) in account. (*DA* 2.2, 413b11–29)

Despite the overlap in content between this passage and the discussion of plant and insect divisibility in *DA* 1.5, a close reading shows that Aristotle is no longer asking whether the soul can be (indirectly) spatially divided into capacity—parts. As we have seen, Aristotle's solution to this problem is 'no'. Instead, he is asking two different questions: whether the capacities for nutrition, perception, reasoning, and local motion are themselves (a) distinct kinds of soul – because he has shown that the soul is not uniform – or (b) capacity—parts of the soul; and if (b), whether at least one of these capacity—parts – which he grants are separable (or conceptually divisible from one another) in account – could *also* be separated 'in place'.

³⁶ The closest Aristotle gets to such a thesis is the idea that the nutritive soul, which he only identifies as a 'principle' in plants, can be separated (χωρίζεται) from the perceptive soul (*DA* 2.1, 412a28–30). I take it that Aristotle means that a *whole plant soul* can exist separately from a *whole perceptive soul*, insofar as plants and animals, in which such souls belong, exist as spatially independent of one another.

Aristotle has already determined in *DA* 1.5 that things with only *one* soul capacity, like plants, can exist in a place that is separate from another capacity of soul (such as the capacity of perception in animals). He has also determined that one cannot spatially divide a soul, in virtue of dividing the body, into different capacity-parts. What he has not determined is whether there are any other soul capacities, apart from the nutritive capacity, that are (or could be) separated so as to exist without the others. He raises the possibility that mind, insofar as it does not seem to require a bodily organ, might be able to do so. In fact, one could make a *prima facie* case for why this would be. If I cut off my hand, it may twitch (a sign that the perceptive capacity still exists in it), and perhaps even continue to grow its nails slightly (a sign that the nutritive capacity still exists in it) for a short period of time. However, to say that it retained a capacity for theoretical thinking might seem perverse. At the least, it seems true that rational souls are not spatially divisible into further *whole* rational souls like the perceptive souls of insects, and the nutritive souls of plants. If so, what happens to our minds when we die? Aristotle's suggestion is that it might continue to exist somewhere else.³⁷

10.8 The Results of Aristotle's Solution

Aristotle's solution to the puzzle of the soul's spatial divisibility, which he arrives at through a criticism of a Timaeon view about its part-hood, and his empirical investigations into the soul capacities of divided animals and plants, provides a negative constraint on his developing view of soul. This constraint leads him to affirm his *Part-Hood Thesis*: soul is the sort of thing that cannot be spatially divided into smaller quantitative parts or into capacity-parts, but whose capacities can be distinguished (or divided) in account from one another. The only way some souls can be spatially divided is by dividing the body they are in into new *whole souls* containing the same capacity-parts.³⁸

³⁷ Cf. *DA* 1.3, 407a2–3. Cf. Burnyeat (2008); Miller (2012).

³⁸ Even though Aristotle does not abandon his *Part-Hood Thesis*, in the specifics, he will go on to refine it. In other works, he accepts that the account of the soul's parts, because of the *Non-Uniformity Thesis*, which claims that there are different kinds of soul in nature, will be tied closely to the kinds of organs that living things have that help to preserve their material nature. In particular, he will affirm that the soul's nutritive and perceptive capacity-parts, at least, are not always uniformly present throughout the whole of a living body, but are located specifically in its middle-part or pericardial region, from which their activities extend out to the other organs of the body. Cf. *Iuv.* 1, 467b13–16; *Iuv.* 2, 468b1–15. Cf. *MA* 10, 702a36–703b2.

The route to these results, as we have seen, is complex. Aristotle accomplishes his criticism of the Academic thesis that the soul has spatial-parts first by showing that this leaves unexplained the nature of the soul's unity. He next shows that this theory conflicts empirically with the fact that various psychological capacities cannot be spatially divided from one another (and are sometimes duplicated) when living bodies are spatially dissected. He also argues that the Timaeon thesis has difficulty in accounting for the role of mind in the body. In appealing to the imaginative component of his demonstrative heuristic, Aristotle complains that there is no spatial-part of the body that would even conceivably be relevant to the explanation of mental functions (e.g. as providing a necessary instrument for the activity of thinking). As we have seen, his difficulty with the Timaeon view places a further negative constraint on him to affirm the *Separability Thesis*. However, the main result of this part of Aristotle's inquiry into earlier Greek psychology is that it gives him good reasons to affirm the *Part-Hood Thesis*: an individual soul's parts are related to the body's parts by being uniformly causally present to the spatially extended body it ensouls, and not by being quantitatively present – with one part here, and one part there – in the way that determinate magnitudes are.³⁹

³⁹ Gal. *PHP* 5.4.3, p. 312, despite incorrectly assimilating Plato's tripartite view of the soul (appetitive, spirited, and rational) to Aristotle's (nutritive, perceptive, and rational), rightly notes that Aristotle's view differs from that of Plato and Hippocrates in that the latter thinkers took the soul's parts to be *spatially separate* from one another (καὶ τοῖς τόποις αὐτὰς ἀλλήλων κεχωρισθαι). However, cf. Gal. *Histor. Philosoph.* 24 = Diels 615.

Conclusion: Hylomorphic Psychology as a Dualism

But mind seems to be generated within us as some kind of substantial being that does not perish.

Aristotle, *De Anima* 1.4, 408b18–19

The End of the Path

Aristotle's detailed and laborious investigation into earlier Greek psychology has shown that no earlier thinker provided an essential definition of soul from which the science of soul can be constructed. This is because none of them adequately explained the soul–body relation, nor were any able to deduce the soul's *per se* attributes in a fully satisfactory manner. However, in the previous chapters, I have argued that there are some major, and deeper results of this investigation, which provide constraints that help to determine the shape of Aristotle's hylomorphic psychology.

It should now be apparent that Aristotle's *Hylomorphic Thesis* is formulated with a view to providing an explanation of the soul–body relation in terms of the *Axiom of Causal Association*.¹ To remind, the *Axiom of Causal Association* states:

For all x and y , x can be affected by y by nature if and only if (1) x and y fall under a common genus, U , which contains opposite species F and G , and (2) x has F and y has G .

It is with a view to this axiom that Aristotle begins to determine the nature of soul, when he writes:

Indeed, we say that there is one genus (γένος) of beings (ὄντων) which is substance (οὐσίαν), and of this, one sort is material (ύλην), which is not with respect to itself a particular 'this' (τόδε τι), but another sort shape

¹ See Chapter 2.

or form (μορφήν καὶ εἶδος), in virtue of which something is already said to be a particular ‘this’, and a third that is composed of both (ἐκ τούτων). (DA 2.1, 412a6–9)

In arguing that soul is a substance, Aristotle first posits a single *genus* to which soul and body belong by nature, namely, *substance*.² This satisfies condition (1) of the *Axiom of Causal Association*. His division of substance into three kinds satisfies condition (2) of the axiom. This is because, within the genus of substance, material and form are identified with metaphysical quasi-opposites – potentiality and fulfilment – which can combine in something ‘intermediate’ between the two, namely, the hylomorphic composite. He writes:

For ‘substance’ is said in three ways, just as we said, of which one is form, the other material, the third what is from both (ἐξ ἀμφοῖν), and of these, material is potentiality (δύναμις) and form is fulfilment (ἐντελέχεια), and since what is made out of both is ensouled, the body is not the fulfilment of the soul, but soul is the fulfilment of a certain kind of body. (DA 2.2, 414a14–19)

In identifying soul as a fulfilment, and the body as a material, in effect, Aristotle confirms that the soul–body relation within a living hylomorphic composite can be understood as an essential agent–patient relation, in which relation the soul serves as the agent which carries a form and an active potentiality, and the body as the patient which carries the passive potentiality to be likened to this form.³

That this solution is meant to fill in the definitional gap alleged in DA 1.3 to be present in earlier Greek psychologies is confirmed in the lines that follow:

And for this reason they suppose correctly who think that the soul is neither without body nor is a body. For it is not a body, but something belonging to a body, and on account of this (διὰ τοῦτο), it belongs in a body (ἐν σώματι ὑπάρχει), and in this sort of body, and not just as earlier thinkers fitted it (ἐνέρμοζον) into the body, not adding anything to their definition (προσδιορίζοντες) about which body or in what sort [it exists], although it is apparent that any chance thing will not receive just any chance thing (τοῦ τυχόντος δέχεσθαι τὸ τυχόν). Thus, this comes about also in accordance with a rational account (κατὰ λόγον); for the fulfilment of each thing, by nature, is generated in what exists potentially and in the

² Cf. *Phys.* 1.6, 189a13–14.

³ Cf. *Phys.* 3.3, 202a13–16, *Phys.* 3.3, 202a36–b22; DA 2.4, 416a13–b2. See Carter (2018).

appropriate material. It is apparent from what has been said that soul is a certain fulfilment and a formal determination of something that has the potential to be this sort of thing. (*DA* 2.2, 414a19–28)

So understood, the *Hylomorphic Thesis*, unlike the definitions of soul offered by earlier Greek psychologies, is able to account for *why* the soul is in the body, and, what sort of body can receive a soul. Certain elements within this definition of soul can even be used to provide a demonstration of why the soul is in the body. Such a demonstration might run:

1. [A] Soul belongs_{def} to [B] first-fulfilment of a potentiality for life.
2. [B] First-fulfilment of a potentiality for life belongs_{per se} to [C] natural body having a potentiality for life.
3. [A] Soul belongs_{per se} to [C] natural body having a potentiality for life.

With his additional metaphysical distinctions from *DA* 2.5 between first-fulfilments and second-fulfilments in place, Aristotle can also use his hylomorphic definition of soul to account for the soul's *per se* attributes – the ability to move the body, the ability to cognise, and the ability to nourish. He will claim that each of these abilities, when brought into activity, are second-fulfilments of the soul which actualise a potentiality of a living body, in accordance with the *Efficient-Final Causal Thesis*.

However, the most startling consequence of understanding that Aristotle's developed his *Hylomorphic Thesis* with a view to explaining the soul–body relation and the soul's *per se* attributes, is that it reveals that hylomorphic psychology is clearly a kind of *dualist* psychological theory. As we saw in Chapter 2, in requiring the explanation of the soul–body relation to conform to the *Axiom of Casual Association*, Aristotle commits himself to what I called associative entity dualism. However, this kind of dualism is non-committal on an important question, namely, whether causally associating entities can exist *independently* of one another.

In his criticism of the harmony theory of soul, as well as of Academic theories of the soul's divisibility into spatial-parts, which leads to the affirmation of the *Part-Hood Thesis*, Aristotle commits himself to the view that the capacity for life in plants, and the perceptual capacity, viewed as 'parts' of soul, are essentially fulfilments of certain bodies. This means that they cannot exist independently of the bodies whose potentialities they fulfil. We can call this species of associative entity dualism *interdependent substance dualism*. In respect of plants and non-human animals, Aristotle is an interdependent substance dualist. This interdependence

can be captured by the *Hylomorphic Thesis*, which takes a natural instrumental body as something that essentially has a potentiality *for* receiving the formal fulfilment which is soul, and the formal fulfilment which is soul as essentially the fulfilment *of* such a potentially receptive body.

However, Aristotle does not think that all fulfilments are fulfilments of a specific material potentiality. This is because whilst all formal substances are fulfilments, only *some* formal substances are essentially the fulfilment *of* certain bodily potentials.⁴ Other fulfilments are *self-fulfilments*. In particular, he thinks that the divine mind that keeps the cosmos moving, in thinking about its own thinking, is self-fulfilled, and as such exists independently of material bodies.⁵

However, in his investigation of Anaxagoras, Aristotle came to think that the human mind as well, in virtue of being ‘unmixed’ with the body and having no organ, is like this divine mind, and hence cannot be the fulfilment of a particular body or organ either, except indirectly.⁶ Aristotle’s implicit view is that the rational soul of a human being, despite containing the nutritive and perceptive capacities as potentialities within it,⁷ is essentially a fulfilment of the body ‘just as the sailor is of a ship’⁸ – directly bestowing actuality and motion to the body so that it can perform its functions, but intrinsically, in virtue of having a capacity that is peculiar to it, being something that can exist in a place separated from the body where it performs *its own* function – thinking.⁹

As Aristotle claims in *DA* 1.1, if one part of soul is capable of existing separately from the body, then the whole human soul is so capable, as the *Separability Thesis* implies.¹⁰ Moreover, this thesis is consistent with the *Hylomorphic Thesis*, which is formulated only to explain why souls naturally belong to bodies, not to prove that *all* kinds of soul belong *essentially* to bodies.

Help in understanding this claim about human souls is provided by the *Non-Uniformity Thesis*, which resulted from Aristotle’s criticism that earlier thinkers did not explain why some of the soul’s *per se* attributes are absent in some living things. This gives him reason to think that the

⁴ *DA* 2.1, 413a3–7.

⁵ Cf. *DA* 2.1, 413a8–10; *Metaph.* 11.7, 1072b26–9.

⁶ See *Metaph.* Z.7, 1032a27–b23.

⁷ *DA* 2.3, 414b28–32.

⁸ *DA* 2.1, 413a8–9.

⁹ In this way, Aristotle’s view of human soul turns out to be analogous to Plato’s *Rep.* 10 conception of a soul purified of its bodily accretions. See Chapter 9, Section 9.1.

¹⁰ *DA* 1.1, 403a8–11.

souls of different kinds of things will be fulfilments of specifically different kinds of potentialities for life, such as of a *rational* life, or a *perceptive* life, or a *nutritive* life.¹¹ This means that, insofar as humans live nutritive, perceptive, and practical lives, their souls require a body in which those motions can be actualised; however, insofar as they engage in rational contemplation, which requires no bodily organ and is not a motion, they do not.¹²

Hence, while all living composite substances depend upon their souls for their existence and definition, not all souls depend upon composite substances for theirs. This is because Aristotle accepts Anaxagoras' conception of mind into his account of human soul. We can call this species of associative substance dualism *interrelated substance dualism*. On Aristotle's considered view, (i) the human body is a substance existentially and definitionally *dependent* upon a human soul, but (ii) the human soul is a substance existentially and definitionally *independent* of the human body, which is still related to the human body in virtue of being able to act as a fulfilment of its practical capacities for action (as well as fulfilling its nutritive and perceptive potentialities). Hence, with respect to human beings, Aristotle turns out to be an interrelated substance dualist.

Both of these conclusions, understandably, might be resisted. The dominant trend in Aristotelian scholarship in recent decades has been to depict hylomorphic psychology as a *via media* between physicalism and Cartesian dualism.¹³ One very good reason for doing so is that, in an uncontroversial sense, Aristotle is a dualist about *every* object that we see below the moon. Hence, it is tempting to think that it is a trivial truth that no soul can be reduced to a physical property of the body, because no object in Aristotle's natural philosophy, whether animate or inanimate,

¹¹ Cf. *DA* 2.3, 414b25–33.

¹² Hence, the parts of a human soul that *are* fulfilments of the body or its parts, namely, the nutritive and perceptive capacities, could not be active after its separation from its body at death. The only activity that would belong to such a separated soul would be imageless contemplation, which is why Aristotle thinks that separated souls do not hope or remember. This separated soul would not, therefore, be a human being (which is a rational soul in flesh and bones), but it would be a rational soul, just as the concavity of a nose, if it could be separated from that nose, would not be a snub, but would be concavity. Cf. *DA* 3.4, 429b10–19. See *Metaph.* Z.11, 1036b22–8. Cf. *DA* 1.4, 408b19–28; *DA* 3.5, 430a23–5; Philop. (*In de anima*, 164.24–165.2). If this is right, it implies that the παθητικός νοῦς of *DA* 3.5 that is destructible is not mind as such, but mind insofar as it is or uses the faculty of imagination (e.g. in practical reasoning). Cf. Brentano (1977, 141); *DA* 2.2, 413b25; *DA* 3.9, 432b26–9; *DA* 3.3, 427b27; *NE* 6.1, 1139a5–17; *Pol.* 1.5, 1254b8.

¹³ See Barnes (1971/1972, 114); Shields (1988b).

can be so reduced. Hence, one might conclude that if hylomorphic psychology is a dualist theory, it is not so in any interesting sense.

However, here are some reasons to reject the temptation to think this way. First, the kind of form that Aristotle determines the soul to be is strikingly different from, for example, the shape of a statue; for it is not a qualitative form like a colour, nor a mathematical form like a shape, but a natural form or nature that is a principle of motion and rest. Further, this form has at least one important feature usually thought to belong to Cartesian substances, which we saw on display in Aristotle's criticism of Democritus. This is the ability to cause extended bodies to move around by thinking and making a decision. This commitment, incidentally, is one of the main reasons why Aristotle's account of soul is not compatible with modern materialist functionalist accounts of the mind. Material 'functional organisations' cannot, as Aristotelian souls can, act as unified efficient causes upon the material bodies they belong to.¹⁴

Second, if we define a Cartesian substance as, 'an independently existing thing',¹⁵ the objection that non-rational souls are not really 'things' because they are dependent upon material substances for their existence is, at least as an interpretation of Aristotle, metaphysically suspect. For one thing, Aristotle claims that the reverse is true: it is rather the formal substance that is a determinate unity (or a 'this'), and the material substance that is *not* a determinate thing. For another, it is precisely *because* Aristotle thinks of the soul-body relation in terms of non-independent substances which act as 'parts' within a whole that he is able to avoid Descartes' mind-body problem, and able to claim that, 'it is not necessary to ask whether the soul and body are one'.¹⁶ If so, then thinking of hylomorphic psychology as a metaphysical *solution* to the soul/mind-body problem that he inherits from immaterialists like Plato and materialists like Empedocles is justified.

Third, nearly all scholars of Aristotle acknowledge that he is a dualist in some important sense with respect to his claims about mind (*voûs*). The really important question is whether human souls are substances which are essentially separable minds, or only a kind of mind (e.g. the so call 'passive mind' or 'affectable mind') which perishes with the ensouled

¹⁴ Cf. Nussbaum and Putnam (1992); Cohen (1992, 71–2); Miller (1999, 322).

¹⁵ Cohen (1992, 58).

¹⁶ *DA* 2.1, 412b6–9. His reason is that a fulfilment (whether it belongs to a material or not) is most of all 'one', and hence, makes other things, like the body, 'one' as well – in both a physical and a temporal sense.

body. If the former is the case, as I have argued, then rational souls *are* properly characterised as Cartesian substances. This will be so despite the fact that their mental lives after death will not be nearly as colourful as that of a Cartesian *mens*.¹⁷ (They might, however, be happier lives.)

Finally, one might also challenge the coherence of a dualist interpretation of hylomorphic psychology from the opposite direction: since no material substance is a determinate 'this' until it receives its form, any interesting dualist interpretation of the *Hylomorphic Thesis* will fall prey to Ackrill's problem.¹⁸ The problem is this: Aristotle is committed to the idea that an *F* (e.g. an axe, or an eye) which can no longer perform its essential function is only an *F* homonymously (i.e. it is no longer really an *F*); however, he claims in *DA* 2.1 that the 'body having life potentially' which the soul is a fulfilment of, is 'not the [non-instrumental] body that has lost its soul, but the [instrumental] one that has it'.¹⁹ This might be taken to imply that there is no instrumental body that exists as a material distinct from its soul which could serve as a material potentiality in need of fulfilment, and further, that there is no material that underlies the destruction of a living thing when its body turns into a corpse at death and there is no more 'body' except homonymously. This is because the only instrumental body that the soul fulfils is the one which *necessarily* has soul.

Whilst some scholars think that Aristotle's solution to this puzzle is best solved by appeal to the idea that a living body in a way has two bodies (e.g. an organic and a non-organic body),²⁰ or two kinds of matter (e.g. proximate and non-proximate matter, or functional and compositional matter),²¹ I think a better solution can be found in Aristotle's account of animal generation. This is hinted at in the clause which completes *DA* 2.1, 412b26, in which Aristotle claims, 'and seed and fruit are potentially this sort of body'. Aristotle does not mean that a seed or a fruit is, 'a body having life potentially'. He means that the non-ensouled seeds and fruits that come from ensouled living things are themselves *potentially* the sorts of bodies which 'potentially have life'. Seeds and fruits have first-potentialities for becoming bodies with a *passive* second-potentiality for life (as distinct from the *active* first-fulfilment/second-potentiality of life which is soul).

¹⁷ Cf. Wilkes (1992, 125).

¹⁸ See Ackrill (1972/1973).

¹⁹ *DA* 2.1, 412b25–6.

²⁰ See Shields (2002, 131–54).

²¹ See Whiting (1992).

According to Aristotle's embryology, a potentially living instrumental body needs to be generated from a pre-animate non-instrumental body. This happens when a male seed containing the capacity-parts of nutritive, perceptive, and rational soul *in potentiality* (the last of which enters it from some divine source 'outside') acts upon a female seed that contains – again, in potentiality – both the nutritive capacity-part of soul, and the spatial-parts of a potentially living body. In acting, the male seed begins a process of shaping the female seed through its motions and actualising those potentialities.²² In the case of humans, at some time t_1 , when the motions from a male seed have enformed the female seed to the degree it becomes an embryo with a heart which can begin to grow on its own, the nutritive capacity-part of the soul comes to be active (or exist as a first-fulfilment). After the requisite organs for perception are formed, the same is the case at some time t_{1+n} for the perceptive part of the soul, at which time the embryo becomes an animal.²³ However, the rational part of the soul comes into activity after birth, when a person has acquired universal concepts and can think on their own.

Thus, Aristotle's reasons for holding that the body which has a 'potentiality for life', i.e. a passive second-potentiality for life, is not the one that has lost its soul, derives both from his commitment to the doctrine that kinds are identified by the functions they are able to perform in virtue of their forms, *and* his causal and biological account of how animals are generated. The only bodies that are potentially such as to potentially live are seeds whose ensouled parents have set them in motion and given them a generative power through their own connate *pneuma*. If so, we can apply this same logic to the transition from a body to a homonymous body at death: for an instrumental body also has a potentiality to become a non-instrumental body, just as any of the elemental bodies (e.g. fire) has a potentiality to be destroyed into another element (e.g. air). If so, Aristotle's doctrine of essentially ensouled bodies does not challenge the dualist understanding of hylomorphic psychology that I have defended here, but rather refines it. In particular, it shows that there is an analogue for Descartes' pineal gland in both Aristotle's account of reproduction (in the seed) and his account of the ultimate origin of animal motion (around the heart), namely, that the 'joint' of soul and body is the connate *pneuma*.

²² GA 2.3, 736b8–737a33.

²³ GA 2.3, 736b1–3.

What does this dualistic result imply about Aristotle's conception of the science of soul? We learn from the *Metaphysics* that among the sciences (ἐπιστήμαι) there are three theoretical ones: mathematics (μαθηματική), natural science (φυσική), and theology (θεολογική).²⁴ Aristotle differentiates these sciences from one another by two criteria: whether the objects they study are separable or inseparable from material, and whether those objects are immovable or movable (or imply motion). Mathematical science studies objects that are inseparable (but abstractable) from material and immovable; natural science studies objects that are inseparable from material but movable (or imply motion); theology studies objects that are both separable from material and immovable. Where does that leave the science of soul, now that its peculiar principles – the common definition of soul in terms of two interacting substances, and the determination of three particular kinds of soul – have been discovered?

First, Aristotle's criticism of the harmony theory of soul and Xenocrates have shown that psychology is not subordinate to the science of mathematics, nor its subordinate science, harmonics. Second, his view that souls are essentially involved in the production of nutrition, perception, and local motion – despite their being essentially unmoved (in the technical sense that their changes are preservative and 'complete'), show that this part of psychology, at least, is subordinate to natural science, as he claims in *DA* I.1, 403a27–8, and as he assumes in the *Parva Naturalia*. However, insofar as Aristotle affirms that the human soul, in virtue of its rational capacity, is separable from material and unmoved, as Anaxagoras and the Platonic Academy held, he has also shown that there is a part of psychology that is subordinate to theology – the study of human soul insofar as it is divine νοῦς.²⁵

²⁴ *Metaph.* E.1, 1026a13–19; *Metaph.* K.7, 1064a30–b3.

²⁵ For a defence of this view, see Reeve (2017, xxiv–xxxii).

Bibliography

Aristotle

- Barnes, J. (1984). *The Complete Works of Aristotle*. Princeton, NJ: Princeton University Press.
- Barnes, J. (1994). *Posterior Analytics*. Oxford: Clarendon Press.
- Hamlyn, D. (2002). *Aristotle De Anima: Books II and II (With Passages from Book I)*. Oxford: Clarendon Press.
- Hett, W. (1986). *Aristotle: On the Soul, Parva Naturalia, On Breath* (Loeb Classical Library). Cambridge, MA: Harvard University Press.
- Hicks, R. (1907). *Aristotle De Anima*. Cambridge: Cambridge University Press.
- Jannone, A., and Barbotin, E. (2002). *Aristote: De l'ame*. Paris: Les Belles Lettres.
- Joachim, H. (1922). *Aristotle on Coming-To-Be and Passing-Away*. Oxford: Clarendon Press.
- Reeve, C. (2017). *Aristotle: De Anima. Translated with Introduction and Notes*. Indianapolis, IN/Cambridge: Hackett Publishing Company.
- Rodier, G. (1900). *Aristote, Traité de l'ame*, 2 vols. Paris: Ernest Leroux.
- Ross, W. (1936). *Aristotle's Physics: A Revised Text with Introduction and Commentary*. Oxford: Clarendon Press.
- (1949). *Aristotle's Prior and Posterior Analytics*. Oxford: Clarendon Press.
- (1956). *Aristotelis De Anima*. Oxford: Clarendon Press. [=OCT]
- (1961). *Aristotle De Anima: Edited, with Introduction and Commentary*. Oxford: Oxford University Press.
- Shields, C. (2016). *Aristotle: De Anima, Translated with an Introduction and Commentary*. Oxford: Clarendon Press.
- Smith, J. (1931). *De Anima*, trans. J. Smith, in *The Works of Aristotle*, vol. 3, ed. W.D. Ross. Oxford: Oxford University Press.
- Torstrik, A. (1863). *Aristotelis De Anima Libri III*. Berolini: apud Weidmannos.
- Tricot, J. (2010). *Aristote: De l'âme*. Paris: Vrin.

Presocratics

- Curd, P. (2010). *Anaxagoras of Clazomenae: Fragments and Testimonia. A Text and Translation with Notes and Essays*. Toronto, Ontario: University of Toronto Press.
- Diels, H. (1951). *Die Fragmente der Vorsokratiker*, 6th edn, revised by Walter Kranz, 3 vols. Berlin: Weidmann.

- Graham, D. (2010). *The Texts of Early Greek Philosophy: The Complete Fragments and Selected Testimonies of the Major Presocratics*, 2 vols. Cambridge: Cambridge University Press.
- Kahn, C. (1994). *Anaximander and the Origins of Greek Cosmology*. Indianapolis, IN: Hackett Publishing.
- Kirk, G., Raven, J., and Schofield, M. (1983). *The Presocratic Philosophers*. Cambridge: Cambridge University Press.
- McKirahan, R. (2010). *Philosophy before Socrates: An Introduction with Texts and Commentary*, 2nd edn. Indianapolis, IN: Hackett Publishing.
- Sider, D. (2005). *The Fragments of Anaxagoras: Edited with an Introduction and Commentary*. Sankt Augustin: Academia Verlag.
- Taylor, C. (1999). *The Atomists Leucippus and Democritus: Fragments: A Text and Translation*. Toronto, Ontario: University of Toronto Press.
- Wright, M. (2001). *Empedocles: The Extant Fragments*. London: Bristol Classical Press.

Other Ancient and Medieval Authors

- Aeschylus. (1955). *Septem Quae Supersunt Tragoedias*, ed. D. Page. Oxford: Oxford University Press.
- Aquinas, T. (1959). In *Aristotelis librum de Anima commentarium*, ed. M. Pirotta. Taurini: Marietti. [= *In De an.*]
(1964–1981). *Summa Theologiae*. London: Blackfriars. [= *Summa*]
- Augustine. (1933). *De Quantitate Animae: The Measure of the Soul*. Latin text, trans. F. Tourscher. London: B. Herder.
- Cicero, M. (1927). *Tusculan Disputations* (Loeb Classical Library). London: W. Heineman. [= *Tusc. Disp.*]
- Diels, H. (1879). *Doxographi Graeci*. Berlin: Reimer.
- Epicurus. (1926). *Epicurus: The Extant Remains, with Short Critical Apparatus*, ed. and trans. C. Bailey. Oxford: Clarendon Press.
- Euripides. (1984). *Euripides Fabulae*, Vol. 1, ed. J. Diggle. Oxford: Oxford University Press.
- Fortenbaugh, W., and Schütrumpf, E. (2001). *Dicaearchus of Messana: Text, Translation, and Discussion* (Rutgers University Studies in Classical Humanities). London: Transaction Books.
- Galen. (1979). *Galen on the Doctrines of Hippocrates and Plato* (*Corpus Medicorum Graecorum*; V.4, 1,2), ed. and trans. P. De Lacy. Berlin: Akademie-Verlag. [= *PHP*]
- Heinze, R. (1892). *Xenocrates: Darstellung der Lehre und Sammlung der Fragmente*. Leipzig: B.G. Teubner.
- Herodotus. (1958). *Historiae*, ed. C. Hude. Oxford: Oxford University Press.
- Homer. (1920). *Homeri Opera*, 5 vols. Oxford: Oxford University Press.
- Philoponus. (1991). *Philoponus: On Aristotle on the Intellect* (De Anima 3.4–8), trans. W. Charlton. London: Duckworth.

- Plutarch. (1976). *De animae Procreation in Timaeo*, trans. by Harold Cherniss, in: *Plutarch's Moralia*, Vol. XIII, Part 1. London: Loeb.
- Simplicius. (1995). *On Aristotle's on the Soul 1.1–2.4*, trans. J. Urmson. Ithaca, NY: Cornell University Press.
- Waszink, J. (2010). *Quinti Septimi Florentis Tertulliani De Anima*. Leiden, the Netherlands: Brill.

Modern Literature

- Ackrill, J. (1972/1973). 'Aristotle's Definitions of *Psuche*'. *Proceedings of the Aristotelian Society* 73:119–33.
- (1981). 'Aristotle's Theory of Definition: Some Questions on *Posterior Analytics* II 8–10', in Berti (1981):359–84.
- Algra, K., van der Horst, P., and Runia, D. (1996). *Polyhistor: Studies in the History and Historiography of Ancient Philosophy*. Leiden, the Netherlands: Brill.
- Annas, J. (1974). 'Forms and First Principles'. *Phronesis* 19:257–83.
- (1976). *Aristotle's Metaphysics, Books M and N*. Oxford: Clarendon Press.
- Bailey, C. (1928). *The Greek Atomists and Epicurus: A Study*. Oxford: Clarendon Press.
- Balme, D. (1941). 'Greek Science and Mechanism II: The Atomists'. *Classical Quarterly* 35:23–8.
- Baltussen, H. (1996). 'A "Dialectical" Argument in *De Anima* A 4: On Aristotle's Use of *Topoi* in Systematic Contexts', in Algra, van der Horst, and Runia (1996):333–43.
- (2000). *Theophrastus against the Preocratics and Plato: Peripatetic Dialectic in the De Sensibus*. Leiden, the Netherlands: Brill.
- Barker, A. (1984). 'Aristoxenus' Theorems and the Foundations of Harmonic Science'. *Ancient Philosophy* 4:23–64.
- (1988). 'Aristotle on Perception and Ratios'. *Phronesis* 26:248–66.
- (2007). *The Science of Harmonics in Classical Greece*. Cambridge: Cambridge University Press.
- Barnes, J. (1971/1972). 'Aristotle's Concept of Mind'. *Proceedings of the Aristotelian Society* 72:101–14.
- (1980). 'Aristotle and the Methods of Ethics'. *Revue internationale de philosophie* 133/134: 490–511.
- (1982). *The Presocratic Philosophers*. London: Routledge.
- Barney, R. (2012). 'History and Dialectic (*Metaphysics* A 3, 983a24–4b8)', in Steel and Primavesi (2012):66–104.
- Bartoš, H. (2006). 'Varieties of the Ancient Greek Body Soul Distinction'. *Rhizai* 1: 59–78.
- Bastit, M. (1996). 'Qu'est-ce qu'une Partie de l'Âme pour Aristote?', in Viano (1996):13–36.
- Beare, J. (1906). *Greek Theories of Elementary Cognition: From Alcmaeon to Aristotle*. Oxford: Clarendon Press.

- Benson, H. (2003). 'The Method of Hypothesis in the Meno'. *Proceedings of the Boston Area Colloquium in Ancient Philosophy* 18:95–143.
- Berryman, S. (2002). 'Aristotle on Pneuma and Animal Self-Motion'. *Oxford Studies in Ancient Philosophy* 23:85–97.
- (2003). 'Ancient Automata and Mechanical Explanation'. *Phronesis* 48:344–69.
- Berti, E. (1981). *Aristotle on Science: Proceedings of the Eighth Symposium Aristotelicum*. Padua, Italy: Editrice Antenore.
- Betegh, G. (2004). *The Derveni Papyrus: Cosmology, Theology and Interpretation*. Cambridge: Cambridge University Press.
- (2009). 'The Limits of the Soul: Heraclitus B45 DK. Its Text and Interpretation', in Hülisz (2009):391–414.
- Blair, G. (1967). 'The Meaning of "Energeia" and "Entelecheia" in Aristotle'. *International Philosophical Quarterly* 7:101–17.
- Bobzien, S. (1998). 'The Inadvertent Conception and Late Birth of the Free-Will Problem'. *Phronesis* 43:133–75.
- (2000). 'Did Epicurus Discover the Free Will Problem?' *Oxford Studies in Ancient Philosophy* 19: 287–337.
- Bogen, J. (1996). 'Fire in the Belly: Aristotelian Elements, Organisms, and Chemical Compounds', in Lewis and Bolton (1996):183–216.
- Bolton, R. (1987). 'Definition and Scientific Method in Aristotle's *Posterior Analytics* and *Generation of Animals*', in Gotthelf and Lennox (1987):120–66.
- (1991). 'Aristotle's Method in Natural Science: *Physics* I', in Judson (1991):1–29.
- (1994). 'The Problem of Dialectical Reasoning (Συλλογισμός)'. *Ancient Philosophy* 14:99–132.
- Bonitz, H. (1955). *Index Aristotelicus*, ed. Jürgen Bona Meyer. Graz, Austria: Akademische Druck-U. Verlagsanstalt.
- Bordt, M. (2011). 'Why Aristotle's God Is Not the Unmoved Mover'. *Oxford Studies in Ancient Philosophy* 40:91–109.
- Bos, A. (2007). 'Aristotle on Dissection of Plants and Animals and His Concept of the Instrumental Soul-body'. *Ancient Philosophy* 27:95–106.
- Bowen, A., and Wildberg, C. (2009). *New Perspectives on Aristotle's De Caelo*. Leiden, the Netherlands: Brill.
- Bowin, J. (2011). 'Aristotle on Various Types of Alteration in *De Anima* II 5'. *Phronesis* 56:138–61.
- Bradshaw, D. (1997). 'Aristotle on Perception: The Dual-Logos Theory'. *Apeiron* 30:143–61.
- Brancacci, A., and Morel, P.-M. (2007). *Democritus: Science, the Arts, and the Care of the Soul – Proceedings of the International Colloquium on Democritus*. Leiden, the Netherlands: Brill.
- Brentano, F. (1977). *The Psychology of Aristotle*, ed. and trans. R. George. Berkeley, CA: University of California Press.
- Brody, B. (1972). 'Towards an Aristotelian Theory of Scientific Explanation'. *Philosophy of Science* 39:20–31.
- Bronstein, D. (2016). *Aristotle on Knowledge and Learning*. Oxford: Oxford University Press.

- Burkert, W. (1972). *Lore and Science in Ancient Pythagoreanism*. Cambridge, MA: Harvard University Press.
- Burnyeat, M. (1981). 'Aristotle on Understanding Knowledge', in Berti (1981):97–139.
- (1992a). 'Is an Aristotelian Philosophy of Mind Still Credible? A Draft', in Nussbaum and Rorty (1992):15–26.
- (1992b). 'How Much Happens When Aristotle Sees Red and Hears Middle C? Remarks on *De Anima* 2.7–8', in Nussbaum and Rorty (1992):421–34.
- (2002). '*De Anima* ii.5'. *Phronesis* 47:28–90.
- (2004). 'Aristotle on the Foundations of Sublunary Physics', in de Haas and Mansfeld (2004):7–24.
- (2008). *Aristotle's Divine Intellect*. Milwaukee, WI: Marquette University Press.
- Bywater, I. (1888). 'Aristotelia III'. *The Journal of Philology* 17:53–74.
- Carter, J. (2017). 'Aristotle's Critique of Timaeus Psychology'. *Rhizomata* 5:51–78.
- (2018). 'Does the Soul Weave? Reconsidering *De Anima* 1.4, 408a29–b18'. *Phronesis* 63:25–63.
- Caston, V. (1993). 'Aristotle and Supervenience'. *The Southern Journal of Philosophy* 31 (Supplement):107–35.
- (1997). 'Epiphenomenalisms, Ancient and Modern'. *The Philosophical Review* 106:309–63.
- (1999). 'Aristotle's Two Intellects: A Modest Proposal'. *Phronesis* 44:199–227.
- (2000). 'Aristotle's Argument for Why the Understanding Is Not Compounded with the Body'. *Proceedings of the Boston Area Colloquium in Ancient Philosophy* 16:135–75.
- (2005). 'The Spirit and the Letter: Aristotle on Perception', in Salles (2005):245–320.
- Chalmers, A. (1997). 'Did Democritus Ascribe Weight to Atoms?' *Australasian Journal of Philosophy* 75:279–87.
- Chalmers, D., Manley, D., and Wasserman, R. (2009). *Metametaphysics: New Essays on the Foundations of Ontology*. Oxford: Clarendon Press.
- Charles, D. (2005). *Aristotle on Meaning and Essence*. Oxford: Oxford University Press.
- Charlton, W. (1985). 'Aristotle and the *Harmonia* Theory', in Gotthelf (1985):131–50.
- (1991). 'Aristotle's Definition of Soul'. *Phronesis* 25: 170–86.
- Cherniss, H. (1935). *Aristotle's Criticism of Presocratic Philosophy*. Baltimore, MD: Johns Hopkins Press.
- (1944). *Aristotle's Criticism of Plato and the Academy*. Baltimore, MD: Johns Hopkins Press.
- Chiba, K. (2012). 'Aristotle on Heuristic Inquiry and Demonstration of What it Is', in Shields (2012):171–201.
- Cleary, J. (1994). 'Phainomena in Aristotle's Methodology'. *International Journal of Philosophical Studies* 2: 61–97.
- Code, A. (1987). 'Soul as Efficient Cause in Aristotle's Embryology'. *Philosophical Topics* 15:51–9.

- (1991). 'Aristotle, Searle, and the Mind–Body Problem', in Lepore and Van Gulick (1991):105–13.
- Cohen, S. (1992). 'Hylomorphism and Functionalism', in Nussbaum and Rorty (1992):57–73.
- Cohoe, C. (2013). 'Why the Intellect Cannot Have a Bodily Organ: *De Anima* 3.4'. *Phronesis* 58:344–77.
- (2016). 'When and Why Understanding Needs *Phantasmata*: A Moderate Interpretation of Aristotle's *De Memoria* and *De Anima* on the Role of Images in Intellectual Activities'. *Phronesis* 61:337–72.
- Collobert, C. (2002). 'Aristotle's Review of the Presocratics: Is Aristotle Finally a Historian of Philosophy?'. *Journal of the History of Philosophy* 40:281–95.
- Coope, U. (2005). *Time for Aristotle: Physics IV. 10–14*. Oxford: Clarendon Press.
- Cooper, J. (2012). 'Conclusion – and Retrospect: *Metaphysics* A.10', in Steel and Primavesi (2012):333–64.
- Corcilius, K., and Gregoric, P. (2010). 'Separability vs. Difference: Parts and Capacities of the Soul in Aristotle'. *Oxford Studies in Ancient Philosophy* 39:81–120.
- Crane, T., and Patterson, S. (2000). *The History of the Mind Body Problem*. London: Routledge.
- Crowley, T. (2008). 'Aristotle's "So-Called" Elements'. *Phronesis* 53:223–42.
- Curd, P. (2010). *Anaxagoras of Clazomenae: Fragments and Testimonia. A Text and Translation with Notes and Essays by Patricia Curd*. Toronto, Ontario: University of Toronto Press.
- Curd, P., and Graham, D. (2008). *The Oxford Handbook of Presocratic Philosophy*. Oxford: Oxford University Press.
- Dancy, R. (1996). 'Keeping Body and Soul Together: On Aristotle's Theory of Forms', in Wians (1996):249–87.
- Danieli, M. (1984). *Zum Problem der Traditionsaneignung bei Aristoteles: Untersucht am Beispiel von De Anima I*. Königstein/Ts: Anton Hain.
- Darcus, S. (1977). 'Daimon Parallels the Holy Phren in Empedocles'. *Phronesis* 22:175–90.
- Davidson, D. (2001). *Essays on Actions and Events*. Oxford: Clarendon Press.
- de Haas, F., and Mansfeld, J. (2004). *Aristotle: On Generation and Corruption, Book 1: Symposium Aristotelicum*. Oxford: Clarendon Press.
- Descartes, R. (1984). *The Philosophical Writings of Descartes*, eds. J. Cottingham, R. Stoothoff, and D. Murdoch. Cambridge: Cambridge University Press. [=CSM]
- Deslauriers, M. (2007). *Aristotle on Definition*. Leiden: Brill.
- Destrée, P., Salles, R., and Zingano, M. (2014). *What Is Up to Us?: Studies on Agency and Responsibility in Ancient Philosophy*. Sankt Augustin: Academia Richarz.
- Dillon, J. (1985). 'Xenocrates' Metaphysics: Fr. 15 (Heinze) Re-Examined'. *Ancient Philosophy* 5:47–52.
- (1996). *The Middle Platonists: 80 B.C.–A.D. 200*. New York: Cornell University Press.

- (2003). *The Heirs of Plato: A Study of the Old Academy (347–274 B.C.)*. Oxford: Clarendon Press.
- Distelzweig, P. (2013). 'The Intersection of the Mathematical and Natural Sciences: The Subordinate Sciences in Aristotle'. *Apeiron* 46:85–105.
- Driscoll, J. (1992). 'The Anaxagorean Assumption in Aristotle's Account of Mind', in Preus and Anton (1992):273–92.
- Edmunds, L. (1972). 'Necessity, Chance, and Freedom in the Early Atomists'. *Phoenix* 26:342–57.
- Engberg-Peterson, T. (1979). 'More on Aristotelian *Epagoge*'. *Phronesis* 24:301–19.
- Englert, W. (1987). *Epicurus on the Swerve and Voluntary Action*. Atlanta, GA: Scholars Press.
- Evans, J. (1977). *Aristotle's Concept of Dialectic*. Cambridge: Cambridge University Press.
- Everson, S. (1991). *Psychology*. Cambridge: Cambridge University Press.
- (1997). *Aristotle on Perception*. Oxford: Oxford University Press.
- Falcon, A. (2009). 'The Scope and Unity of Aristotle's Investigation of the Soul', in Van Riel and Destrée (2009):167–81.
- Ferejohn, M. (1988). 'Meno's Paradox and *De Re* Knowledge in Aristotle's Theory of Demonstration'. *History of Philosophy Quarterly* 5:99–117.
- (1991). *The Origins of Aristotelian Science*. New Haven, CT: Yale University Press.
- Feser, E. (2013). *Aristotle on Method and Metaphysics*. Basingstoke: Palgrave Macmillan.
- Frede, D. (1992). 'The Cognitive Role of *Phantasia* in Aristotle', in Nussbaum and Rorty (1992):279–95.
- (1996). 'The Philosophical Economy of Plato's Psychology: Rationality and Common Concepts in the *Timaeus*', in Frede and Stryker (1996):29–58.
- (2012). 'The *Endoxon* Mystique: What *Endoxa* Are and What They Are Not'. *Oxford Studies in Ancient Philosophy* 43:184–215.
- Frede, D., and Reis, B. (2009). *Body and Soul in Ancient Philosophy*. Berlin: Walter de Gruyter.
- Frede, D., and Stryker, G. (1996). *Rationality in Greek Thought*. Oxford: Clarendon Press.
- Frede, M. (1992). 'On Aristotle's Conception of the Soul', in Nussbaum and Rorty (1992):93–107.
- (2008). 'Aristotle on Thinking'. *Rhizai* 5:287–301.
- Frede, M., and Charles, D. (2000). *Aristotle's Metaphysics Lambda: Symposium Aristotelicum*. Oxford: Clarendon Press.
- Frede, M., and Long, A. (2011). *A Free Will: Origins of the Notion in Ancient Thought*. London: University of California Press.
- Freeland, C. (1990). 'Scientific Explanation and Empirical Data in Aristotle's *Meteorology*'. *Oxford Studies in Ancient Philosophy* 8:67–102.
- Furley, D. (1967). *Two Studies in the Greek Atomists*. Princeton, NJ: Princeton University Press.
- (1994). 'Self Movers', in Gill (1994):3–14.
- Gelber, J. (2010). 'Form and Inheritance in Aristotle's Embryology'. *Oxford Studies in Ancient Philosophy* 39:183–212.

- Gerson, L. (2004). 'The Unity of Intellect in Aristotle's *De Anima*. *Phronesis* 49:348–73.
- Gill, M. (1994). *Self-Motion: From Aristotle to Newton*. Princeton, NJ: Princeton University Press.
- Gill, M., and Pellegrin, P. (2006). *A Companion to Ancient Philosophy*. Oxford: Blackwell Publishing.
- Goldin, O. (1996). *Explaining an Eclipse: Aristotle's Posterior Analytics 2.1–10*. Ann Arbor, MI: University of Michigan Press.
- Gomperz, H. (1932). 'ΑΣΩΜΑΤΟΣ'. *Hermes* 67:155–67.
- Gotthelf, A. (1985). *Aristotle on Nature and Living Things: Philosophical and Historical Studies*. Pittsburgh, PA: Mathesis Publications Inc.
- (1989). 'Teleology and Spontaneous Generation in Aristotle: A Discussion'. *Apeiron* 22:181–93.
- Gotthelf, A., and Lennox, J. (1987). *Philosophical Issues in Aristotle's Biology*. Cambridge: Cambridge University Press.
- Gottschalk, H. (1971). 'Soul as Attunement'. *Phronesis* 16:179–98.
- Graham, D. (2004). 'Was Anaxagoras a Reductionist?'. *Ancient Philosophy* 24:1–18.
- Granger, H. (1995a). 'Aristotle on the Subjecthood of Form.' *Oxford Studies in Ancient Philosophy* 13:135–60.
- (1995b) 'The Subjecthood of Form: A Reply to Shields.' *Oxford Studies in Ancient Philosophy* 13:177–85.
- Gregoric, P. (2007). *Aristotle on the Common Sense*. Oxford Aristotle Studies. Oxford: Oxford University Press.
- Guthrie, W. (1957). 'Aristotle as Historian'. *Journal of Hellenic Studies* 77:35–41.
- (1962–1981). *A History of Greek Philosophy*, 6 vols. Cambridge: Cambridge University Press.
- Hamlyn, D. (1976). 'Aristotelian Epagoge'. *Phronesis* 21:167–84.
- Hankinson, R. (1998). *Cause and Explanation in Ancient Greek Thought*. Oxford: Clarendon Press.
- Heinaman, R. (1990). 'Aristotle and the Mind–Body Problem'. *Phronesis* 35:83–102.
- (2007). 'Actuality, Potentiality and *De Anima* II.5'. *Phronesis* 52:139–87.
- Hardie, W. (1968). 'Aristotle and the Freewill Problem'. *Philosophy* 43:274–8.
- Haslanger, S. (1994). 'Parts, Compounds, and Substantial Unity', in Scaltsas, Charles, and Gill (1994):129–70.
- Heidel, W. (1906). 'Qualitative Change in Pre-Socratic Philosophy'. *Archiv für Geschichte der Philosophie* 19:333–79.
- (1913). 'On Certain Fragments of the Pre-Socratics: Critical Notes and Elucidations'. *Proceedings of the American Academy of Arts and Sciences* 48:681–734.
- Horky, P. (2013). 'Theophrastus on Platonic and "Pythagorean" Imitation'. *Classical Quarterly* 63:686–712.
- Huby, P. (1967). 'The First Discovery of the Freewill Problem'. *Philosophy* 42:353–62.
- Hülsz, E. (2009). *Nuevos ensayos sobre Heráclito. Actas del Segundo Symposium Heracliteum*. Ciudad de México: Universidad Nacional Autónoma de México.

- Hussey, E. (1972). *The Pre-Socratics*. London: Duckworth.
- (1991). 'Aristotle's Mathematical Physics: A Reconstruction', in Judson (1991):213–42.
- (2006). 'Parmenides on Thinking', in King (2006):13–30.
- (2012). 'Aristotle on Earlier Natural Science', in Shields (2012):17–45.
- Ierodiakonou, K. (2005). 'Empedocles on Colour and Colour Vision'. *Oxford Studies in Ancient Philosophy* 29:1–37.
- Ilievski, P. (1993). 'The Origin and Semantic Development of the Term Harmony'. *Illinois Classical Studies* 18:19–29.
- Irwin, T. (1987). 'Ways to First Principles: Aristotle's Methods of Discovery'. *Philosophical Topics* 15:109–34.
- (1988). *Aristotle's First Principles*. Oxford: Clarendon Press.
- Jaeger, W. (1934). *Aristotle: Fundamentals of the History of His Development*, trans. R. Robinson. Oxford: Oxford University Press.
- Johansen, T. (1997). *Aristotle on the Sense-Organs*. Cambridge: Cambridge University Press.
- (2008). 'Soul as an Inner Principle of Change: The Basis of Aristotle's Psychological Naturalism', in Scott (2008):276–300.
- (2012). *The Powers of Aristotle's Soul*. Oxford: Oxford University Press.
- Johnson, M. (2009). 'Spontaneity, Democritean Causality, and Freedom'. *Elenchos* 30:5–52.
- (2014). 'Changing Our Minds: Democritus on What Is Up to Us', in Destrée, Salles and Zingano (2014):1–17.
- Judson, L. (1991). *Aristotle's Physics: A Collection of Essays*. Oxford: Clarendon Press.
- (2005). 'Aristotelian Teleology'. *Oxford Studies in Ancient Philosophy* 29:341–66.
- (2018). 'Physics I.5', in Quarantotto (2018):130–53.
- Kahn, C. (1960). 'Religion and Natural Philosophy in Empedocles' Doctrine of the Soul'. *Archiv für Geschichte der Philosophie* 42:3–35.
- (1992). 'Aristotle on Thinking', in Nussbaum and Rorty (1992):359–80.
- Kakkuri-Knuuttila, M. (2005). 'The Relevance of Dialectic Skills to Philosophical Inquiry in Aristotle'. *Rhizai* 2:31–74.
- Kamtekar, R. (2009). 'Knowing by Likeness in Empedocles'. *Phronesis* 54:215–38.
- Kant, I. (1996). *Critique of Pure Reason*, trans. W. Pluhar. Indianapolis, IN: Hackett Publishing. [=CPR]
- Kelsey, S. (2003). 'Aristotle's Definition of Nature'. *Oxford Studies in Ancient Philosophy* 25:59–87.
- (2010). 'Hylomorphism in Aristotle's Physics'. *Ancient Philosophy* 30:107–24.
- King, R. (2006). *Common to Body and Soul: Philosophical Approaches to Explaining Living Behavior in Greco-Roman Antiquity*. Berlin: Walter de Gruyter.
- Kosman, A. (1973). 'Understanding, Explanation, and Insight in the *Posterior Analytics*', in Lee, Mourelatos and Rorty (1973):374–92.
- Kupreeva, I. (2004). 'Alexander of Aphrodisias on Mixture and Growth'. *Oxford Studies in Ancient Philosophy* 27:297–334.

- Laks, A. (1993). 'Mind's Crisis. On Anaxagoras' ΝΟΥΣ'. *The Southern Journal of Philosophy* 31:19–37.
- (1999). 'Soul, Sensation, and Thought', in Long (1999):252–3.
- Laks, A., and Rashed, M. (2004). *Aristote et le mouvement des animaux*. Lille, France: Presses Universitaires Du Septentrion.
- Landor, B. (1981). 'Aristotle on Demonstrating Essence'. *Apeiron* 19:116–32.
- Langton, R. (2000). 'The Musical, the Magical and the Mathematical Soul', in Crane and Patterson (2000):13–33.
- Lee, E., Mourelatos, A., and Rorty, R. (1973). *Exegesis and Argument*. Assen, the Netherlands: van Gorcum.
- Lee, M. (2005). *Epistemology after Protagoras: Responses to Relativism in Plato, Aristotle, and Democritus*. Oxford: Clarendon Press.
- Leibniz, G. (1989). *Philosophical Essays*, trans. R. Ariew and D. Garber. Indianapolis, IN: Hackett Publishing. [=PE]
- Lennox, J. (1982). 'Teleology, Chance, and Aristotle's Theory of Spontaneous Generation'. *Journal of the History of Philosophy* 20:219–38.
- (2014). 'Aristotle on the Emergence of Material Complexity: Meteorology IV and Aristotle's Biology. HOPOS: The Journal of the International Society for the History of Philosophy of Science 4:272–305.
- Lepore, E., and Van Gulick, R. (1991). *John Searle and His Critics*. Cambridge, MA: Blackwell Publishing.
- Leshner, J. (1995). 'Mind's Knowledge and Powers of Control in Anaxagoras DK B12'. *Phronesis* 40:125–42.
- Leunissen, M. (2010a). 'Aristotle's Syllogistic Model of Knowledge and the Biological Sciences: Demonstrating Natural Processes'. *Apeiron* 43:31–60.
- (2010b). *Explanation and Teleology in Aristotle's Science of Nature*. Cambridge: Cambridge University Press.
- Levine, J. (1983). 'Materialism and Qualia: The Explanatory Divide'. *Pacific Philosophical Quarterly* 64:357–8.
- Lewis, F. (1996). 'Self-knowledge in Aristotle'. *Topoi* 15:39–58.
- (2003). 'Is There Room for Anaxagoras in an Aristotelian Theory of Mind?' *Oxford Studies in Ancient Philosophy* 25:89–129.
- Lewis, F., and Bolton, R. (1996). *Form, Matter, and Mixture in Aristotle*. Oxford: Blackwell Publishing.
- Lloyd, G. (1966). *Polarity and Analogy*. Cambridge: Cambridge University Press.
- Lloyd, G., and Owen, G. (1978). *Aristotle on Mind and the Senses: Proceedings of the Seventh Symposium Aristotelicum*. Cambridge: Cambridge University Press.
- Long, A. (1966). 'Thinking and Sense-perception in Empedocles: Mysticism or Materialism?' *Classical Quarterly* 16: 256–76.
- (1999). *The Cambridge Companion to Early Greek Philosophy*. Cambridge: Cambridge University Press.
- Lorenz, H. (2007). 'The Assimilation of Sense to Sense-Object in Aristotle'. *Oxford Studies in Ancient Philosophy* 33:179–220.
- Manning, G. (2013). 'The History of Hylomorphism'. *Journal of the History of Ideas* 74:173–87.

- Mansfeld, J. (1990). 'Doxography and Dialectic: The *Sitz in Leben* of the *Placita*', in W. Haase, and H. Temporini (eds.), 1990, *Aufstieg und Niedergang der römischen Welt*, Teil II: Principat, Band 36.4. Berlin-New York: De Gruyter:3056–229.
- (2007). 'Out of Touch: Philoponus as a Source for Democritus', in Brancacci and Morel (2007):277–92.
- (2010). '*Physikai doxai* and *problēmata physica* in Philosophy and Rhetoric: From Aristotle to Aëtius (and Beyond)', in Mansfeld and Runia (2010):33–97.
- Mansfeld, J., and Runia, D. (2010). *Aëtiana: The Method and Intellectual Context of a Doxographer. Volume Three. Studies in the Doxographical Traditions of Ancient Philosophy*. Leiden, the Netherlands: Brill.
- Mansion, S. (1961a). *Aristote et les problèmes de méthode*. Paris, France: Louvain.
- (1961b). 'Le rôle de l'exposé et de la critique des philosophies antérieures chez Aristote', in Mansion (1961):35–56.
- Marmodoro, A. (2014). *Aristotle on Perceiving Objects*. New York: Oxford University Press.
- (2017). *Everything in Everything: Anaxagoras's Metaphysics*. Oxford: Oxford University Press.
- Martin, A., and Primavesi, O. (1998). *L'Empédocle de Strasbourg: (P. Strasb. gr. Inv. 1665–1666)*. Berlin: Bibliothéque nationale et universitaire de Strasbourg; Walter de Gruyter.
- McDaniel, K. (2009). 'Ways of Being', in Chalmers, Manley, and Wasserman (2009):290–319.
- McKirahan, R. (1983). 'Aristotelian Epagoge in Prior Analytics 2.21 and Posterior Analytics 1.1'. *Journal of the History of Philosophy* 21:1–13.
- (1992). *Principles and Proofs: Aristotle's Theory of Demonstrative Science*. Princeton, NJ: Princeton University Press.
- McPherran, M. (2010). *Plato's Republic: A Critical Guide*. Cambridge: Cambridge University Press.
- Menn, S. (1992). 'Aristotle and Plato on God as *Nous* and as the Good'. *The Review of Metaphysics* 45:543–73.
- (1995). *Plato on God as Nous*. Carbondale, IL: Southern Illinois University Press.
- (2002). 'Aristotle's Definition of the Soul and the Programme of the *De Anima*'. *Oxford Studies in Ancient Philosophy* 12:83–139.
- Meyer, S. (1994). 'Self-Movement and External Causation', in Gill (1994):65–80.
- Miller, Jr., F. (1999). 'Aristotle's Philosophy of Soul'. *The Review of Metaphysics* 53:309–37.
- (2012). 'Aristotle on the Separability of Mind', in Shields (2012):306–39.
- Modrak, D. (1991). 'The *Nous*-Body Problem in Aristotle'. *The Review of Metaphysics* 44:755–74.
- Morel, P.-M. (1996). *Démocrate et la recherche des causes*. Paris, France: Klincksieck.
- Morison, B. (2002). *On Location: Aristotle's Concept of Place*. Oxford: Oxford University Press.

- (2004). 'Self-motion in *Physics* VIII', in Laks and Rashed (2004):67–79.
- Morris, S. (1993). *Daidalos and the Origins of Greek Art*. Princeton, NJ: Princeton University Press.
- Mourelatos, A. (1984). 'Aristotle's Rationalist Account of Qualitative Interaction'. *Phronesis* 29:1–16.
- (2005). 'Intrinsic and Relational Properties of Atoms in the Democritean Ontology', in Salles (2005):39–63.
- (2006). 'The Concept of the Universal in Some Later Pre-Platonic Cosmologists', in Gill and Pellegrin (2006):56–76.
- Nussbaum, M. (1982). 'Saving Aristotle's Appearances', in Nussbaum and Schofield (1982):267–94.
- (1984). 'Aristotelian Dualism: Reply to Howard Robinson'. *Oxford Studies in Ancient Philosophy* 2:197–207.
- Nussbaum, M., and Putnam, H. (1992). 'Changing Aristotle's Mind', in Nussbaum and Rorty (1992):27–56.
- Nussbaum, M., and Rorty, A. (1992). *Essays on Aristotle's De Anima*. Oxford: Clarendon Press.
- Nussbaum, M., and Schofield, M. (1982). *Language and Logos: Studies in Ancient Greek Philosophy Presented to G.E.L. Owen*. Cambridge: Cambridge University Press.
- Nuyens, F. (1973). *L'évolution de la psychologie d'Aristote*. Louvain, Belgium: Éditions de l'Institut supérieure de philosophie.
- O'Brien, D. (1969). *Empedocles' Cosmic Cycle*. Cambridge: Cambridge University Press.
- O'Keefe, T. (2005). *Epicurus on Freedom*. Cambridge: Cambridge University Press.
- Osborne, C. (1987a). 'Empedocles Recycled'. *The Classical Quarterly* 37:24–50.
- (1987b). *Rethinking Early Greek Philosophy: Hippolytus of Rome and the Presocratics*. Ithaca, NY: Cornell University Press.
- (2000). 'Rummaging in the Recycling Bins of Upper Egypt: A Discussion of Martin and O. Primavesi, L'Empédocle de Strasbourg'. *Oxford Studies in Ancient Philosophy* 18:329–56.
- Owen, G. (1961). 'Tithenai ta Phainomena', in Mansion (1961):83–103.
- (1968a). *Aristotle on Dialectic: The Topics (Proceedings of the Third Symposium Aristotelicum)*. Oxford: Clarendon Press.
- (1968b). 'Dialectic and Eristic in the Treatment of the Forms', in Owen (1968):103–25.
- Peramatzis, M. (2011). *Priority in Aristotle's Metaphysics*. Oxford: University of Oxford.
- Perälä, M. (2018). 'Aristotle on Perceptual Discrimination'. *Phronesis* 63:257–92.
- Philip, J. (1966). 'The "Pythagorean" Theory of the Derivation of Magnitudes'. *Phoenix* 20:32–50.
- Pines, S. (1961). 'A New Fragment of Xenocrates and Its Implications'. *Transactions of the American Philosophical Society* 51:3–34.
- Polansky, R. (2007). *Aristotle's De Anima*. Cambridge: Cambridge University Press.

- Politis, V. (2001). 'Aristotle's Account of the Intellect as Pure Capacity'. *Ancient Philosophy* 21:375–402.
- Preus, A., and Anton, J. (1992). *Essays in Greek Philosophy V: Aristotle's Ontology*. New York: State University of New York Press.
- Primavesi, O. (2008). 'Empedocles: Physical and Mythical Divinity', in Curd and Graham (2008):250–83.
- Pritzl, K. (1994). 'Opinions as Appearances: *Endoxa* in Aristotle'. *Ancient Philosophy* 14:41–50.
- Purinton, J. S. (1999). 'Epicurus on "Free Volition" and the Atomic Swerve'. *Phronesis* 44:253–99.
- Quarantotto, D. (2018a). *Aristotle's Physics Book I: A Systematic Exploration*. Cambridge: Cambridge University Press.
- (2018b). 'The Role, Structure, and Status of Aristotle's *Physics* I', in Quarantotto (2018):1–40.
- Rechenauer, G. (2009). 'Demokrits Seelenmodell und die Prinzipien der atomistischen Physik', in Frede and Reis (2009):111–42.
- Reeve, C. (2012). 'Aristotle's Philosophical Method', in Shields (2012):150–70.
- Renahan, R. (1980). 'On the Greek Origins of the Concepts Incorporeality and Immateriality'. *Greek, Roman and Byzantine Studies* 21:105–38.
- Ryle, G. (2002). *The Concept of Mind*. Chicago, IL: University of Chicago Press.
- Salles, R. (2005). *Metaphysics, Soul, and Ethics in Ancient Thought: Themes from the Work of Richard Sorabji*. Oxford: Oxford University Press.
- Scaltsas, T., Charles, D., and Gill, M. (1994). *Unity, Identity, and Explanation in Aristotle's Metaphysics*. Oxford: Clarendon Press.
- Schibli, H. (1993). 'Xenocrates' Daemons and the Irrational Soul'. *Classical Quarterly* 43:143–67.
- Schofield, M. (1980). *An Essay on Anaxagoras*. Cambridge: Cambridge University Press.
- (1991a). 'Explanatory Projects in *Physics* 2.3 and 7'. *Oxford Studies in Ancient Philosophy* (Supplementary Volume) 9:29–40.
- (1991b). 'Heraclitus' Theory of Soul and its Antecedents', in Everson (1991):13–34.
- (1992). 'Aristotle on the Imagination', in Nussbaum and Rorty (1992):249–77.
- Scott, D. (2008). *Maieusis. Essays in Ancient Philosophy in Honour of Myles Burnyeat*. Oxford: Oxford University Press.
- Searle, J. (1997). *The Mystery of Consciousness*. New York: The New York Review of Books.
- Sedley, D. (1983). 'Epicurus' Refutation of Determinism', in Συζήτησις: *studi sull' epicureismo greco e romano offerti a Marcello Gigante*. Napoli, Italy: G. Macchiaroli:11–51.
- (2007). *Creationism and its Critics in Antiquity*. Los Angeles, CA: University of California Press.

- Shields, C. (1988a). 'Soul as Subject in Aristotle's *De Anima*'. *The Classical Quarterly* 38:140–9.
- (1988b). 'Soul and Body in Aristotle'. *Oxford Studies in Ancient Philosophy* 6:103–37.
- (1995a). 'Intentionality and Isomorphism in Aristotle'. *Proceedings of the Boston Area Colloquium of Ancient Philosophy* 11:307–30.
- (1995b). 'The Subjecthood of Souls and Other Forms: A Response to Granger'. *Oxford Studies in Ancient Philosophy* 13:161–76.
- (2002). *Order in Multiplicity: Homonymy in the Philosophy of Aristotle*. Oxford: Oxford University Press.
- (2007). 'The Peculiar Motion of Aristotelian Souls'. *Proceedings of the Aristotelian Society* 81:139–61.
- (2010). 'Plato's Divided Soul', in McPherran (2010):147–70.
- (2012). *The Oxford Handbook of Aristotle*. Oxford: Oxford University Press.
- (2013). 'The Phainomenological Method in Aristotle's *Metaphysics*', in Feser (2013):7–27.
- Shorey, P. (1901). 'Aristotle's *De Anima*'. *The American Journal of Philology* 22:149–64.
- (1960). *The Unity of Plato's Thought*. Chicago, IL: University of Chicago Press.
- Sider, D. (2005). *The Fragments of Anaxagoras: Edited with an Introduction and Commentary*. Sankt Augustin: Academia Verlag.
- Silverman, A. (1989). 'Color and Color-Perception in Aristotle's *De Anima*'. *Ancient Philosophy* 9:271–92.
- Sisko, J. (1999). 'On Separating the Intellect from the Body: Aristotle's *De anima* III.4, 429a10–b5. *Archiv für Geschichte der Philosophie* 81:249–67.
- (2000). 'Aristotle's Nous and the Modern Mind'. *Proceedings of the Boston Area Colloquium in Ancient Philosophy* 16:177–98.
- Smith, R. (1993). 'Aristotle on the Uses of Dialectic'. *Synthese* 96:335–58.
- Solmsen, F. (1960). *Aristotle's System of the Physical World: A Comparison with His Predecessors*. Ithaca, NY: Cornell University Press.
- Sorabji, R. (1974). 'Body and Soul in Aristotle'. *Philosophy* 49:63–89.
- (1980). *Necessity, Cause and Blame: Perspectives on Aristotle's Theory*. London: Duckworth.
- (1988). *Matter, Space, and Motion: Theories in Antiquity and Their Sequel*. Ithaca, NY: Cornell University Press.
- (1992). 'Intentionality and Physiological Processes: Aristotle's Theory of Sense Perception', in Nussbaum and Rorty (1992):195–225.
- Steel, C., and Primavesi, O. (2012). *Aristotle's Metaphysics Alpha: Symposium Aristotelicum*. Oxford: Oxford University Press.
- Tarán, L. (1981). *Speusippus of Athens: A Critical Study with a Collection of the Related Texts and Commentaries*. Leiden, the Netherlands: Brill.
- Tracy, T. (1982). 'The Soul/Boatman Analogy in Aristotle's *De anima*'. *Classical Philology* 77:97–112.
- Trépanier, S. (2014). 'From Wandering Limbs to Limbless Gods: δαίμων as Substance in Empedocles'. *Apeiron* 47:172–210.

- Upton, T. (1985). 'The Role of Dialectic and Objections in Aristotelian Science'. *Southern Journal of Philosophy* 22:241–56.
- Van Riel, G., and Destrée, P. (2009). *Ancient Perspectives on Aristotle's De anima*. Leuven: Leuven University Press.
- Viano, C. (1996a). *Corps et âme. Sur le De Anima d'Aristote*. Paris, France: J. Vrin.
- (1996b). 'La Doxographie du *De Anima* (I, 2–5) ou le Contre-modèle de l'Âme', in Viano (1996).
- Vlastos, G. (1945). 'Ethics and Physics in Democritus'. *The Philosophical Review* 54:578–92.
- von Fritz, K. (1943). 'Νοῦς and Νοεῖν in the Homeric Poems'. *Classical Philology* 38:79–93.
- (1945). 'Νοῦς, Νοεῖν and their Derivatives in Pre-Socratic Philosophy (Excluding Anaxagoras): Part I'. *Classical Philology* 40:223–42.
- (1946). 'Νοῦς, Νοεῖν and their Derivatives in Pre-Socratic Philosophy (Excluding Anaxagoras): Part II'. *Classical Philology* 41:12–34.
- Ward, J. (1988). 'Perception and Λόγος in *De Anima* II.12'. *Ancient Philosophy* 8:217–33.
- (2008). *Aristotle on Homonymy: Dialectic and Science*. Cambridge: Cambridge University Press.
- Wardy, R. (1990). *The Chain of Change: A Study of Aristotle's Physics VII*. Cambridge: Cambridge University Press.
- Warren, J. (2007). *Presocratics*. Stocksfield: Acumen.
- Waterlow, S. (1998). *Nature, Change, and Agency in Aristotle's Physics*. Oxford: Oxford University Press.
- Weiss, H. (1938). 'Democritus' Theory of Cognition: (A Discussion of Two Aristotelian Passages concerning Democritus)'. *The Classical Quarterly* 32:47–56.
- Whiting, J. (1992). 'Living Bodies', in Nussbaum and Rorty (1992):75–91.
- (2002). 'Locomotive Soul: The Parts of Soul in Aristotle's Scientific Works'. *Oxford Studies in Ancient Philosophy* 22:141–200.
- Wians, W. (1996). *Aristotle's Philosophical Development: Problems and Prospects*. Landham, MD: Rowman and Littlefield.
- Wilkes, K. (1979). 'Conclusions in the *Meno*'. *Archiv für Geschichte der Philosophie* 61:143–53.
- (1992). 'Ψυχῆ versus the Mind', in Nussbaum and Rorty (1992):109–27.
- Williams, B. (1986). 'Hylomorphism'. *Oxford Studies in Ancient Philosophy* 4:189–99.
- Witt, C. (1992). 'Dialectic, Motion, and Perception: *De Anima*, Book I', in Nussbaum and Rorty (1992):169–83.
- Włodarczyk, M. (2000). 'Aristotelian Dialectic and the Discovery of Truth'. *Oxford Studies in Ancient Philosophy* 18:153–210.
- Wolfsdorf, D. (2008). 'The Method ἐξ ὑποθέσεως at *Meno* 86e1–87d8'. *Phronesis* 53:35–64.

Index Locorum

AESCHYLUS

Eum. – *Eumenides*

647–651, 71

AËTIUS

Placita

1.7.30, 105

4.2.4, 103

ALEXANDER OF

APHRODISIAS

De Anima

24.21–4, 131

30.26–31.5, 206

In Arist. Metaph.

55.20–56.35, 104

ANAXAGORAS

DK59/TEGP Anaxagoras

A47 = TEGP 64, 172

A56, 171

A58 = TEGP 65, 168

A84 = TEGP 32, 50

B1 = TEGP 11[F1], 173

B4 = TEGP 13[F4][F5], 174

B12 = TEGP 31[F15], 169–175, 199

B13 = TEGP 33[F16], 171

B14 = TEGP 34[F17], 171

B18 = TEGP 44[F20], 172

B19 = TEGP 47[F21], 172

ARCHELAUS

DK60

A1, 199

A4, 199

ARISTOPHANES

Cl. – *Clouds*

359, 91

ARISTOTLE

APo – *Posterior Analytics*

1.2, 71b17–25, 32

1.2, 72a14–24, 10

1.2, 72a37–b4, 45

1.7, 75a38–b20, 23

1.7, 75b1, 22

1.7, 75b3–6, 40

1.9, 75b37–76a2, 23

1.13, 78a30–8, 32

1.13, 79a13–16, 23

1.14, 79a17–23, 8

1.19, 81b18–23, 26

1.22, 83b19–20, 22

1.31, 87b29–33, 181

2.1, 89b24–35, 33

2.1, 90a5–7, 33

2.2, 90a9–13, 35

2.2, 90a19–23, 125

2.4, 91a12–b11, 23

2.4, 91a35–b1, 108

2.4, 91b1, 109

2.5, 91b12–92a5, 23

2.6, 92a6–33, 23

2.7, 92a37–b1, 24

2.8, 93a21–4, 30

2.8, 93a21–9, 29, 31

2.8, 93a28–9, 35

2.8, 93b7–12, 31

2.10, 94a11–14, 30

2.10, 93b38–94a5, 31

2.19, 100a3–9, 29

2.19, 100b2, 207

APr – *Prior Analytics*

1.30, 46a3–10, 26, 33

1.30, 46a5, 29

1.30, 46a17–27, 28, 29, 35

2.23, 68b15–37, 24

Ath. Pol. – *Constitution of Athens*

7.4, 6

Cat. – *Categories*

2, 1a26, 209

4, 2a7, 25

4, 1b25–7, 158

DA – On the Soul

- I.1, 402a1–4, 21
 I.1, 402a4, 29
 I.1, 402a4–5, 26
 I.1, 402a6, 77
 I.1, 402a7–8, 77
 I.1, 402a10–22, 22
 I.1, 402a22, 35
 I.1, 402a23–4, 36
 I.1, 402a23–5, 158
 I.1, 402a23–b16, 34
 I.1, 402b1, 206
 I.1, 402b1–2, 193
 I.1, 402b2–9, 203
 I.1, 402b3, 193
 I.1, 402b3–5, 196
 I.1, 402b9–10, 206
 I.1, 402b9–11, 209
 I.1, 402b10–13, 207
 I.1, 402b12–13, 209
 I.1, 402b14–16, 35
 I.1, 402b16–17, 34
 I.1, 402b16–403a2, 35
 I.1, 402b25–403a2, 68
 I.1, 403a2–3, 8
 I.1, 403a3–b19, 12
 I.1, 403a8–11, 222
 I.1, 403a19–24, 38
 I.1, 403a25–7, 66
 I.1, 403a27–8, 227
 I.1, 403a29–31, 38
 I.1, 403a29–b3, 131
 I.1, 403b9–19, 76
 I.1, 403b14–15, 121
 I.1, 403b15–16, 4

 I.2, 403b20–8, 37, 179
 I.2, 403b24–8, 9
 I.2, 403b25–7, 152, 200
 I.2, 403b29, 61
 I.2, 403b31–404a9, 80
 I.2, 404a5–9, 39
 I.2, 404a9–16, 84, 197, 198
 I.2, 404a17–19, 197
 I.2, 404a20–5, 60
 I.2, 404a25–7, 170
 I.2, 404a27–31, 85
 I.2, 404b1–6, 172
 I.2, 404b7–18, 145
 I.2, 404b8–15, 143

 I.2, 404b16–18, 39, 144
 I.2, 404b16–32, 156
 I.2, 404b17–18, 145
 I.2, 404b19–27, 144
 I.2, 404b19–30, 104
 I.2, 404b25–9, 143
 I.2, 404b27–30, 89, 144
 I.2, 404b29–30, 103
 I.2, 404b30–405a2, 39
 I.2, 404b30–405a7, 42
 I.2, 405a2, 39
 I.2, 405a4–5, 90
 I.2, 405a4–8, 89
 I.2, 405a8–13, 90
 I.2, 405a13–19, 175
 I.2, 405a19–21, 13, 52
 I.2, 405a21–4, 143
 I.2, 405a21–5, 13, 42, 197
 I.2, 405a25–8, 13, 42
 I.2, 405a29–b1, 13
 I.2, 405b1–5, 13
 I.2, 405b5–8, 13
 I.2, 405b11–12, 10, 41
 I.2, 405b11–13, 39
 I.2, 405b12, 9
 I.2, 405b13–15, 169
 I.2, 405b19–23, 175
 I.2, 405b23–4, 123
 I.2, 405b26–9, 14
 I.2, 405b30, 39

 I.3, 405b31–406a12, 62
 I.3, 406a1, 60
 I.3, 406a1–2, 62
 I.3, 406a3–4, 12, 25
 I.3, 406a12–13, 25
 I.3, 406a12–22, 65
 I.3, 406a22–30, 67
 I.3, 406a30–b5, 70
 I.3, 406b5–11, 74
 I.3, 406b11–15, 72
 I.3, 406b15–22, 83
 I.3, 406b15–25, 93
 I.3, 406b22–3, 54
 I.3, 406b24–5, 126, 175
 I.3, 406b26–407b26, 74
 I.3, 406b30, 125
 I.3, 407a2–3, 207, 217
 I.3, 407a19, 207
 I.3, 407b9–11, 172
 I.3, 407b13–19, 48, 176

- 1.3, 407b15–19, 9
 1.3, 407b17–19, 25
 1.3, 407b20–6, 53

 1.4, 407b27–32, 123, 125
 1.4, 407b30–1, 61
 1.4, 407b32–4, 126
 1.4, 407b34–408a1, 38, 126
 1.4, 408a1–5, 127
 1.4, 408a3–5, 40
 1.4, 408a5–11, 132
 1.4, 408a12–13, 132
 1.4, 408a13, 209
 1.4, 408a13–18, 133
 1.4, 408a18–24, 134
 1.4, 408a24, 43
 1.4, 408a24–9, 137
 1.4, 408a29–b29, 12
 1.4, 408a32–33, 38
 1.4, 408b5–11, 66
 1.4, 408b15–19, 183
 1.4, 408b18–25, 214
 1.4, 408b18–29, 178
 1.4, 408b19–28, 183, 223
 1.4, 408b32, 105
 1.4, 408b32–409a3, 109
 1.4, 409a2, 207
 1.4, 409a7–10, 112
 1.4, 409a9–10, 25
 1.4, 409a10–16, 114
 1.4, 409a16–17, 38
 1.4, 409a16–21, 114
 1.4, 409a21–5, 116
 1.4, 409a25–8, 118
 1.4, 409a28–30, 119

 1.5, 409b2–4, 117
 1.5, 409b8, 157
 1.5, 409b13–18, 120
 1.5, 409b19–24, 42
 1.5, 409b21, 9
 1.5, 409b24–410a13, 156
 1.5, 410a4–6, 150
 1.5, 410a13–22, 158
 1.5, 410a13–26, 160
 1.5, 410a27, 43
 1.5, 410a27–b7, 150
 1.5, 410a28, 156
 1.5, 410b7–10, 151
 1.5, 410b10–15, 211
 1.5, 410b11, 11
 1.5, 410b16–21, 195
 1.5, 410b21–4, 196
 1.5, 410b27–411a2, 196

 1.5, 411a2–7, 152, 198
 1.5, 411a7–8, 198
 1.5, 411a7–23, 7
 1.5, 411a9, 43
 1.5, 411a9–16, 200
 1.5, 411a16–23, 201
 1.5, 411a24–b5, 209
 1.5, 411a29, 38
 1.5, 411b5–14, 211
 1.5, 411b14–19, 212
 1.5, 411b19–30, 213

 2.1, 412a6–9, 220
 2.1, 412a19–20, 1
 2.1, 412a27–8, 2
 2.1, 412a28–30, 216
 2.1, 412b1, 206
 2.1, 412b5–6, 2
 2.1, 412b6–9, 224
 2.1, 412b10–23, 137
 2.1, 412b18–413a3, 215
 2.1, 412b25–6, 225
 2.1, 412b25–7, 136
 2.1, 413a6–10, 4
 2.1, 413a3–7, 215, 222
 2.1, 413a8–9, 222
 2.1, 413a8–10, 222

 2.2, 413a20–5, 205
 2.2, 413b11–13, 3, 205
 2.2, 413b24–7, 193
 2.2, 413b25, 223
 2.2, 413b11–29, 216
 2.2, 414a14–19, 220
 2.2, 414a19–28, 221
 2.2, 414a23, 48

 2.3, 414b20–5, 204
 2.3, 414b25–33, 223
 2.3, 414b28–32, 222
 2.3, 415a7–11, 173

 2.4, 415a14–22, 181
 2.4, 415b10, 7
 2.4, 415b8–24, 3
 2.4, 415b28–416a9, 25
 2.4, 416a13–b2, 220
 2.4, 416a14, 131

 2.5, 417a2–9, 162
 2.5, 417a26–7, 187
 2.5, 417a27–8, 187
 2.5, 417a28–9, 188
 2.5, 417a31–2, 188

- 2.5, 417b2–5, 186
 2.5, 417b18–26, 98
 2.5, 417b22–4, 181
- 2.6, 418a16–19, 155
- 2.7, 418b13–18, 117
- 2.8, 421a3–6, 196
- 2.9, 422a6–7, 163
- 2.10, 422a34–b5, 163
- 2.11, 424a1–5, 181
 2.11, 424a2–15, 178
 2.11, 424a4–5, 125
- 2.12, 424a25–8, 162
 2.12, 424a25–32, 125
 2.12, 424b14–18, 164
- 3.1, 424b22–425a13, 181
- 3.2, 425b24–5, 183
 3.2, 426a27–b7, 125
 3.2, 426b8–12, 164, 181
- 3.3, 427a17–b5, 154, 182
 3.3, 427a19–29, 143
 3.3, 427b5–6, 154
 3.3, 427b7–10, 173
 3.3, 427b27, 223
 3.3, 428b3, 35
 3.3, 428b18–22, 155
- 3.4, 429a13–24, 178
 3.4, 429a20–1, 179
 3.4, 429a24–9, 180
 3.4, 429b5–9, 184
 3.4, 429b9–22, 181
 3.4, 429b10–19, 223
 3.4, 429b10–21, 179
 3.4, 429b22–9, 184
 3.4, 429b29–430a9, 186
- 3.5, 430a14–15, 181
 3.5, 430a23–5, 223
- 3.7, 431a20–b1, 166
 3.7, 431b2–10, 99
- 3.8, 431b20–4, 181
 3.8, 431b21, 165
 3.8, 431b28, 165
- 3.8, 431b29–432a1, 165
 3.8, 432a3–9, 187
- 3.9, 432a15–23, 211
 3.9, 432a22–b13, 209
 3.9, 432b26–9, 223
- 3.10, 433a11–12, 96
 3.10, 433a12, 97
 3.10, 433a21, 96
 3.10, 433b1, 206
 3.10, 433b13–19, 69
 3.10, 433b25–6, 96
- 3.11, 434a7–8, 99
 3.11, 434a16–21, 100
- 3.13, 435a25, 150
- DC – On the Heavens*
 1.2, 269a30–b17, 69
 1.8, 276a22–6, 68
 1.8, 276b7–11, 69
 1.9, 278b18–21, 198
 2.9, 290b12–29, 125
 3.1, 299a17–24, 207
 3.2, 301a14–15, 151
 3.2, 300a20–b8, 68
 3.2, 301b17–19, 66
 3.4, 303a10–12, 86
 3.4, 303a22, 27
 3.8, 306b32–307a6, 90
 3.8, 307a16–17, 91
 4.4, 312a22–b19, 69
- DI – On Interpretation*
 1, 16a3–7, 209
 5, 17a36, 48
 9, 20b29, 48
- Div. – On Divination in Sleep*
 462b14–18, 27
 464a5–17, 89
- GA – On Generation of Animals*
 1.2, 716a4–7, 139
 1.11, 719a9–11, 21
 1.20, 729a9–12, 139
 1.21, 729b18–21, 139
 2.3, 736b1–3, 226
 2.3, 736b8–737a33, 226
 3.11, 762a18–27, 202
- GC – On Generation and Corruption*
 1.2, 315a3–b1, 79
 1.2, 315b6–10, 86
 1.7, 322b11–19, 49
 1.7, 323b27–8, 50
 1.7, 323b29–324a5, 50

- 1.7, 323b29–324a9, 129
 1.7, 324a26–9, 63
 1.8, 324b26–35, 148
 1.10, 327b20–1, 199
 1.10, 328a18–32, 129
 1.10, 328a20, 129

 2.1, 329a25–35, 130
 2.2, 329b29–33, 130
 2.2, 330a24–5, 130
 2.6, 333b9–11, 135
 2.6, 333b12–13, 135
 2.7, 334a9–15, 149
 2.7, 334a10–15, 128
 2.7, 334b23–9, 129
HA – On the History of Animals
 1.1, 487b9, 25
 1.6, 491a11–13, 21
 4.1, 523a31, 201
Insomn. – On Sleep
 2, 460b18, 35
Iuv. – On Youth and Old Age
 1, 467b13–16, 217
 2, 468a13–b15, 112
 2, 468b1–15, 217
MA – On the Motion of Animals
 6, 700b17–24, 96
 9, 702b20–4, 95
 10, 702a36–703b2, 217
 10, 703a19–703b2, 95
 10, 703a19–20, 96
Mech. – Mechanics
 8, 851b15–852a13, 91
Metaph. – Metaphysics

 A.1, 980b25–982a3, 29
 A.3, 983a24–b1, 2
 A.3, 984a8–11, 149
 A.3, 984b15–20, 168
 A.3, 984b19, 170
 A.4, 985a10–13, 135
 A.4, 985a18–21, 172
 A.4, 985a27–9, 135
 A.5, 985b23–986a13, 138
 A.5, 985b33–986a8, 123
 A.5, 986a1–6, 40
 A.8, 989b29–990a32, 138
 A.9, 992a10–19, 106
 A.9, 992b18–993a10, 159
 A.10, 993a11–18, 6
 A.10, 993a17–24, 138

 B.2, 997a30–2, 22
 B.4, 1000a28, 151
 B.4, 1000b3–8, 151

 B.4, 1000b11–12, 135

 Γ.2, 1003b5, 158
 Γ.3, 1005b21, 48
 Γ.3, 1005b27, 48
 Γ.5, 1009b7–15, 87
 Γ.5, 1009b12–15, 143
 Γ.5, 1010b30–1011a2, 183

 Δ.1, 1013a14–16, 22
 Δ.3, 1014a30–1, 201
 Δ.7, 1017a22–7, 158
 Δ.18, 1022a31–2, 177
 Δ.25, 1023b17–19, 201
 Δ.25, 1023b18–25, 206
 Δ.28, 1024b9–16, 158

 E.1, 1026a13–19, 227
 E.2, 1026a33–1026b1, 158

 Z.1, 1028a10–15, 158
 Z.2, 1028b19–21, 105
 Z.2, 1028b24–7, 105
 Z.7, 1032a27–b23, 222
 Z.11, 1036b22–8, 223
 Z.17, 1041b11–33, 211

 H.6, 1045a14–b23, 211

 Θ.1, 1045b33–4, 158
 Θ.1, 1046a19–26, 49
 Θ.3, 1047a30–b2, 1
 Θ.5, 1048a17, 48
 Θ.10, 1051a34–5, 158

 I.4, 189
 I.10, 1058b36–1059a10, 193

 K.7, 1064a30–b3, 227

 Λ.1, 1069a30–1069b1, 110
 Λ.4, 1070a31–b10, 159
 Λ.7, 1072b26–9, 222
 Λ.7, 1073a6–7, 207
 Λ.9, 1074b24–6, 151
 Λ.9, 1074b35–6, 188
 Λ.10, 1075b1–4, 134

 M.6, 1080b13–16, 110
 M.6, 1080b30–1, 110
 M.7, 1080b22–3, 105
 M.7, 1081b35–7, 110
 M.7, 1082b31–2, 110
 M.8, 1083b1, 105
 M.8, 1083b1–8, 105

- M.8, 1083b6–8, 105
 M.8, 1084b21–2, 110
 M.9, 1085a7–23, 106
 M.9, 1086a5–11, 105

 N.1, 1088a22–34, 159
 N.2, 1088b28–35, 105
 N.2, 1089a35–b2, 105
 N.2, 1090a2–15, 105
 N.3, 1090b14–20, 105
 N.3, 1090b21–4, 106
 N.5, 1092b17–21, 157
 N.6, 1080b30–2, 110
Meteor. – Meteorology
 2.9, 369b11–370a33, 32
 2.9, 369b14–19, 32
 4.12, 390a10–15, 137
NE – Nicomachean Ethics
 1.4, 1095b7, 29
 1.7, 1097a34–1097b5, 75
 1.13, 1102a27–32, 207
 5.1, 1129a17–26, 153
 6.1, 1139a5–17, 223
 6.3, 1139b32, 48
 6.9, 1142b33, 173
 6.13, 1145a4–9, 173
 7.1, 1145b2–7, 24
 7.1, 1145b6–7, 27
 8.1, 1155b1–9, 25
 10.3, 1173b23–8, 127
PA – On the Parts of Animals
 1.1, 640a13–15, 36
 1.1, 640a19–26, 135
 1.1, 640a35, 206
 1.1, 640b20–1, 201
 1.1, 640b30–6, 2
 1.1, 641a17–27, 206
 1.1, 641b4–9, 77
 1.5, 645a36–b3, 36
 2.1, 646a9, 21
 2.1, 646a12–24, 134
 2.2, 647b21, 201
 2.4, 650b18–24, 91
 2.10, 656a1, 194
 4.5, 681b34, 195
 4.7, 683b4–11, 195
Phys. – Physics
 1.1, 184a19–25, 22
 1.1, 185a19–20, 27
 1.4, 187a12–188b18, 170
 1.6, 189a13–14, 220
 2.1, 192b8–9, 66
 2.1, 192b13–1, 76
 2.1, 192b14–15, 66
 2.1, 192b21–22, 76
 2.1, 192b23–7, 63
 2.1, 192b33–4, 66
 2.2, 193b31–5, 4
 2.3, 194b16–195a3, 2
 2.3, 194b23–9, 2
 2.3, 194b26–28, 66
 2.4, 196a20–4, 135

 3.1, 200b28–32, 49
 3.2, 201b26–7, 62
 3.2, 202a8, 7
 3.3, 202a13–16, 220
 3.3, 202a36–b22, 220

 4.1, 209a4–7, 117
 4.1, 209a11–13, 116
 4.2, 209b11–16, 116
 4.3, 210b18–21, 117
 4.4, 210b32–4, 27
 4.4, 211a4–6, 27
 4.4, 211a7–11, 27
 4.4, 211a17–22, 63, 64
 4.4, 212a7–9, 178
 4.5, 212b23–7, 178
 4.5, 212b33–213a1, 69
 4.8, 215a1–6, 68
 4.10, 218a3–5, 211
 4.12, 221b3, 72
 4.13, 222b16, 72
 4.14, 224a1, 178

 5.1, 224a21–30, 63
 5.3, 227a13–17, 211
 5.6, 229b23–230a7, 68
 5.6, 230b10–11, 68

 6.5, 235b8–13, 72
 6.10, 240b8–15, 109
 6.10, 240b12–13, 207

 7.1, 241b34, 114
 7.1, 242b60/242b25, 7
 7.2, 244a7–11, 96
 7.2, 244b10–245a2, 75
 7.3, 246b3–6, 127
 7.3, 247b17–18, 77

 8.2, 253a11–13, 94
 8.4, 254b7–12, 63
 8.4, 255a5–10, 77
 8.5, 256b24–7, 171
 8.5, 257b1–258a2, 114

- 8.5, 257b18–19, 63
 8.7, 261a20–1, 72
 8.10, 266a10, 207
 8.10, 267b25–6, 207
Pol. – Politics
 1.4, 1253b33–1254a1, 94
 1.5, 1254b8, 223
Resp. – On Respiration
 4, 471b30–472a18, 25, 86
 4, 472a4, 85
 4, 472a33, 85
 21, 480b12–20, 196
Rhet. – Rhetoric
 1.5, 1361b7–22, 127
 2.8, 1386a20, 6
Sens. – On Sense and Sensible Objects
 2, 438a4–5, 148
 4, 442a29–b4, 88
 4, 442b26–443a8, 163
 7, 449a5–20, 166
SE – On Sophistical Refutations
 1, 165a10–12, 155
Spirit. – On Breath
 5, 483a30–33, 7
Top. – Topics
 1.1, 100b21–23, 25
 1.2, 101a34–b4, 24
 1.7, 103a38, 132
 1.9, 103b20–104a2, 157
 1.10, 104a15–17, 153
 1.12, 105a13–16, 24
 1.14, 105b30–1, 25
 1.15, 44
 2.4, 111b4–8, 65
 2.7, 113a29–30, 110
 3.6, 120b3–6, 107
 4.1, 120b22–3, 74
 4.1, 120b27, 74
 4.2, 123a13–14, 108
 4.3, 123a25–6, 108
 4.3, 123a33–7, 127
 4.5, 127b32, 132
 4.6, 127b15–16, 94
 6.2, 139a32–140a2, 127
 6.2, 139b32ff, 44
 6.3, 140b2–6, 108
 6.5, 142b25–6, 62
 6.6, 145b10ff, 44
 6.13, 150a15–16, 201
 6.13, 150b22, 132
 6.14, 151a20–5, 132
 7.3, 153a23–6, 23

AUGUSTINE OF HIPPO

Letters

CXVIII.27–28, 89

CICERO

Ad Familiares

15.16.1, 88

De Divinatione

1.3.5, 89

2.67.137, 89

Tusc. Disput.

1.10, 124

1.18, 124

DEMOCRITUS

DK68/TEPG The Atomists

A6 = TEGP 10[F4], 81

A7 = TEGP 40, 81

A14 = TEGP 23, 81

A25 = TEGP 81, 82

A30, 88

A33 = TEGP 7, 79, 93

A37 = TEGP 12[F5], 81

A38 = TEGP 24, 81, 83, 86

A47 = TEGP 32, 83

A60 = TEGP 36, 83

A93a = TEGP 80, 82

A105, 88

A106 = TEGP 114, 86

A108 = TEGP 117, 88

A112 = TEGP 120, 87

A113, 86

A117 = TEGP 134, 93

A118, 88, 89

A119, 88

A135 = TEGP 113, 85

A136, 89

A137, 89

A138 = TEGP 108, 89

A160, 93

TEGP 33, 81

TEGP 34, 81

B1 = TEGP 200, 93

B8 = TEGP 136[F37], 87

B9 = TEGP 136[F33], 86

B11 = TEGP 140[F39], 88

B117 = TEGP 141, 87

B156 = TEGP 13[F6], 86

B166 = TEGP 50[F14], 89

DIOGENES OF APOLLONIA

DK64/TEPG Diogenes of Apollonia

B2 = TEGP 4[F2], 49

B4 = TEGP 7[F4], 197

DIOGENES OF OENOANDA

Inscription

32.1.14–3.14, 101

EMPEDOCLES

DK31/TEGP Empedocles

A28 = TEGP 28, 149

A86 = TEGP 145, 148, 168

A87 = TEGP 148, 169

A92 = TEGP 147, 155

B3 = TEGP 21[F4], 147

B8 = TEGP [F32], 149

B17 = TEGP 41[F20], 135

B17 + Strasbourg Papyrus a(i) + a(ii) =
TEGP 41[F20], 135, 149B20 + Strasbourg Papyrus fr. C = TEGP
44[F21], 135

B21 = TEGP 45[F22], 135, 149

B22 = TEGP 46[F23]135, 149

B23 = TEGP 47[F24], 148, 149

B28 = TEGP 56[F31], 151

B31 = TEGP 60[F35], 151

B35 = TEGP 51[F28], 151

B36 = TEGP 52[F29], 151

B59 = TEGP [F73], 135

B71 = TEGP 150[F101], 148

B84 = TEGP [F105], 147

B96 = TEGP [F69], 155

B103 = TEGP 162[F113], 145, 146

B105 = TEGP 163[F115], 145

B107 = TEGP 165[F117], 145

B109 = TEGP 158[F110], 145, 146, 147, 148

B110 = TEGP 22[F5], 145, 146

B117 = TEGP 178[F124], 53

B138 = TEGP 199[F144], 144

EPICURUS

Ep. ad Men.

134, 101

Nat.

34.21–22, 101

34.26–30, 101

EURIPIDES

Al. – Alcesteis

l. 1076, 71

GALEN

Histor. Philosoph.

24, 218

PHP

5.4.3, 218

HERODOTUS

Hist.

3.62.2–3, 71

HIPPOLYTUS

Ref. haer

2.12, 124

HOMER

Il. – Illiad

5.694–98, 197

18.376, 94

23.698, 85

24.755, 71

Od. – Odyssey

17.218, 143

JOHANNES PHILOPONUS

In de anima

32.33, 103

35.9–11, 206

40.7–41.10, 35

44.1, 103

71.19–34, 86

75.34–76, 104

90.20–4, 42

105.19–20, 83

113.19, 72

114.15, 95

127.21–3, 127

140.25–141.20, 54

144.30–145.7, 127

146.6–8, 125

147.20–2, 127

164.24–165.2, 223

182.11–14, 27, 151

190.8–10, 201

190.14–191.10, 202

199.20–33, 212

In de generatione et corrupt.

158.27–159.3, 81

268.20–7, 131

LEUCIPPUS

DK67/TEGP The Atomists

67B(ia) = TEGP 8, 79

PLATO

Alcib. I. – Alcibiades I

121a4, 94

Crat. – Cratylus

439e1–5, 73

Euthyph. – Euthyphro

10b9ff, 94

Hipp. Maj. – Hippias Major

828a1–3, 94

Leg. – Laws

10, 891c, 59

10, 893b, 66

10, 893c1–2, 67

10, 894c, 67

- 10, 896a3, 61
 10, 896a3-4, 60
 10, 896c9-d1, 67
 10, 896e8-897b5, 67
 10, 897a1-3, 66
 10, 897a3-b1, 70
 10, 898e9-10, 70
Men. – Meno
 71a6-7, 36
 76c4-d5, 147
 81c, 59
 86d3ff, 36
 97c9-98a4, 94
Parm. – Parmenides
 132b3-c12, 184
Phaed. – Phaedo
 79c2-79d7, 65
 81e2-82a1, 53
 82a3-6, 54
 83d4-e3, 194
 93a6-9, 126
 97b8-98c2, 172
 99a5-b2, 126
 114d, 59
Phaedr. – Phaedrus
 245c7, 59
 245c7-8, 72
 245c9, 60
 245e, 108
 246c6-d2, 67
 270d1-7, 194
 271a4-8, 194
Rep. – Republic
 2, 380d8-e1, 72
 2, 381a3-4, 73
 2, 381b10-11, 73
 2, 381c1, 73
 4, 435a5-8, 146
 4, 435b9-c6, 194
 4, 435cff, 59
 4, 436a8-b2, 210
 9, 588b10-11, 67
 10, 608cff, 59
 10, 611a10-612a6, 194
 10, 614b2-21d3, 71
 10, 620c3, 53
Soph. – Sophist
 255c14-15, 63
Tim. – Timaeus
 42c1-4, 54
 44a7-b1, 65
 50b7-9, 73
 50d, 105
 50d-51b, 178
 69e3-72d8, 211
 91d6-92c3, 54
 91e6, 211
Theaet. – Theaetetus
 185e1, 65
 PLUTARCH OF CHAERONEA
Adv. Col.
 4, 1108f, 86
De animae procreatione in Timaeo
 1, 112d, 103
 2, 1012e1ff, 110
 SEXTUS EMPIRICUS
Adv. Math.
 7.147-8, 106
 SIMPLICIUS
In de Anima
 32.29-33.4, 42
 34.21-3, 61
 52.22-26, 13
 SOPHONIAS
In Aristotelis De Anima
 25.27-31, 127
 121.27, 27
 TERTULLIAN
De Anima
 12.2-3, 168
 32.6, 53
 THEMISTIUS
Paraphrasis in de Anima
 2.20, 35
 11.37-12.1, 104
 14.4-23, 42
 15.14-17, 61
 16.19-35, 67
 23.37-24.2, 53
 31.33-5, 104
 32.19-33, 104
 36.20-21, 201
 109.26-110.4, 35
 THEOPHRASTUS
De Sensibus
 7, 148
 17-19, 166
 27, 169
 58, 85
 XENOCRATES
Fragmenta
 Fr. 15, 107
 Fr. 65, 107
 Fr. 66, 107, 117
 Fr. 75, 119
 XENOPHANES
DK21/TEGP Xenophanes
 B7 = TEGP 18[F9], 53

General Index

- actuality, 162, 178, 180, 187, 222
- Alexander of Aphrodisias, 27
- alteration, 3, 65, 89, 91, 128, 162, 164
 - cognitive, 91, 128
 - quasi, 162, 164
- Anaxagoras, 168, 169, 171, 174, 177, 184, 187
 - and mind as unmoved mover, 171
 - on the mind-soul distinction, 175
 - on the unaffectedability of mind, 169, 177, 184, 187
 - on the unmixed nature of mind, 168, 174
- Aquinas, 202
- Archelaus, 199, 201, 202
- Aristoxenus, 8, 123, 132
- axiom, 47, 51, 54, 55, 71, 123, 129, 139, 162, 163, 164, 165, 166, 176, 178, 180, 181, 183, 184, 188, 219
 - of causal association, 47, 51, 54, 55, 71, 123, 129, 139, 162, 166, 176, 183, 184, 219
 - of refined cognitive likeness, 163, 164, 165, 166, 178, 180, 181, 188
- body, 2, 4, 42, 62, 69, 70, 116, 125, 132, 139, 175, 204, 210, 211, 212, 213, 215, 217, 220, 223
 - as composed from opposites, 125
 - as containing many compositions, 132
 - as continuing to live when divided, 213, 217
 - as elemental, 69
 - as essentially linked to the soul, 139
 - as having spatial-parts, 212, 215
 - as held together by the soul, 210, 211
 - as instrument of the soul, 2, 4, 204, 223
 - as material, 220
 - as more or less incorporeal, 42
 - as moved by decision and thinking, 175
 - as not a fulfilment of soul, 220
 - as possessing geometrical points, 116
 - as receiving local motions from the soul, 70
 - as subject to motion *per se*, 65
 - as substance, 220
 - dialectical definition of, 62
- cause, 3, 7, 12, 15, 16, 46, 78, 131, 132, 133, 135, 136, 138
 - efficient cause, 7, 15, 46, 78, 135, 136, 138
 - final cause, 3, 7, 12, 131, 132, 133
 - formal cause, 16
- chance, 48, 50, 52, 53, 134, 135, 136, 168, 220
 - and natural causal relations, 48, 50, 52, 53, 220
 - as a cause of a ratio of elements, 135
 - as a cause of bodily parts, 135
 - as a cause of mixture, 134
 - Love operating by, 136
 - mind not operating by, 168
- Cherniss, Harold, 5
- craft-soul analogy, 53
- death, 189
 - and the survival of the soul, 189
- definition, 2
 - Aristotle's method of discovering, 34
 - of soul in Aristotle, 2
- Democritus, 84, 85
 - on the definition of soul, 84
 - on the explanation of life, 85
- demonstration, 32, 221
 - and explanation, 32
 - of *per se* attributes, 22, 31, 40, 108
 - of why soul is in the body, 221
- demonstrative heuristic, 36
 - its application to earlier theories of soul, 41
 - as a basis for scientific inquiry, 36
- Derveni papyrus, 197, 199
- Descartes, 47, 52, 206
- dialectical method, 25
 - vs.* scientific method, 25
- Dicaearchus, 8, 123, 128
- Diogenes of Apollonia, 13, 42, 143, 197, 199
- division, 23, 28
 - Aristotle's method of, 28
 - Platonic method of, 23

- dualism, 7, 48, 52, 221, 223
 - associative entity, 52, 221
 - Cartesian, 7, 48, 52
 - interdependent substance, 221
 - interrelated substance, 223
- emergent properties, 101, 129, 130, 131, 139
 - absent in Aristotle's theory of mixture, 129
 - and supervenience, 131
 - psychological powers as not, 130, 139
- Empedocles, 136, 150
 - as a harmony theorist, 136
 - as making soul the elements, 150
- endoxa, 25, 26, 28, 112
- explanation, 30, 31, 32, 33, 196
 - as a cause of 'the fact that', 30
 - as defeasible, 33
 - as offering the 'why', 31
 - of *per se* attributes, 35, 45
 - as of preliminary accounts, 32
 - religious, 196
- fulfilment, 1, 125, 204, 215, 220
 - and mathematical ratio, 125
 - as being of capacities, 204
 - as identical to form, 1
 - as not always of a bodily capacity, 215
 - as quasi-opposite of potentiality, 220
 - difference between first- and second-, 1
- harmony, 125
 - theory of soul as a, 125
- homonymy, 158, 203, 225
- indefinite dyad, 105, 107
 - as an element of numbers, 105
 - as material, 107
- induction, 24, 28, 29, 33, 37
 - as providing preliminary accounts, 29, 33
- Meno's paradox, 35
- Orphism, 196, 197, 199
- Owen, G.E.L., 27, 28
- panpsychism, 83, 118, 200
- phenomena, 10, 28, 43, 44, 50, 81, 84, 124, 193, 198
 - as *per se* attributes of soul, 118, 196, 205
 - explanation of, 10, 28
 - of breathing, 84, 198
 - of the soul-body relation, 124
 - perceptible, 81, 193
- plants, 3, 112, 196, 197, 203, 213, 214, 216, 217, 221
- Plato, 61
 - on the definition of soul, 61
- principle (*archê*), 23, 29, 31, 34, 38, 40, 45, 46, 49, 106, 145, 146, 149, 150, 151, 152, 154, 156, 158, 160, 162, 166, 210, 213
 - of causal difference, 49, 160
 - as a cause, 46
 - as a complete definition, 29
 - as a middle term explanation, 31, 34, 40, 45
 - as a preliminary account, 29, 38
 - as a starting point of inquiry, 23
 - of causal likeness, 49
 - of cognitive likeness, 106, 145, 146, 149, 150, 151, 152, 154, 156, 158, 160, 162, 166
 - of life in plants, 213
 - of opposites in Plato, 210
- reduction, 128, 130
 - in Aristotle's theory of mixture, 130
 - of soul to body, 128
- resurrection, 71, 92, 93
 - as possible in atomism, 92, 93
- scientific knowledge (*epistēmē*), 29, 32, 35, 36, 45, 68
 - alternative explanations, 45
 - of the four elemental bodies, 68
- soul, 1, 2, 3, 4, 37, 39, 41, 78, 120, 137, 158, 189, 205, 215, 218, 220, 222
 - Aristotle's definition of, 2, 220
 - as substance, 1, 3, 137, 158, 205, 220
 - as the nature of a body, 78
 - divisibility into spatial-parts
 - vs.* capacity-parts, 218
 - incorporeality of, 41
 - per se* attributes of, 37, 39
 - separability of, 4, 120, 189, 215, 222
 - soul-body relation, 2, 47, 51, 54, 55, 71, 176
 - Plato's account of, 54, 71
- Xenocrates
 - on the definition of soul, 107

